COMPUTERWORLD

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NEWSPAPER

AT&T Moves To Net Mixing Digital Data, Analog Voice

By Phil Hirsch
CW Washington Bureau

NEW ORLEANS — AT&T has announced an interface that will enable users to transmit and receive digital data and analog voice messages alternatively over a standard two-wire local loop, thus converting the existing nationwide telephone network into an end-to-end digital transmission facility. The interface will accommodate data rates up to 56K bit/sec, AT&T said in its announcement, made at the National Telecommunications Conference here last week.

Implementing this new capability will take some time, however. AT&T's announcement covered only the specification of an interface providing what the company called "circuit-switched digital capability." The interface will not be supported until "the 1983-1984 time frame."

Coverage of NTC '81 continues on Page 4 and Pages 15, 16 and 17.

(AT&T said copies of the interface specification — officially, Publication 61310 — will be available on or about Jan. 1 from Publishers Data Center, Inc., P.O. Box C738, Pratt St. Station, Brooklyn, N.Y. 11205. The price is $21 per copy.)

Announcement of the new interface came at an NTC '81 session that featured a paper by Gary Handler, manager of AT&T's Network Planning Division. Handler talked about how the existing telephone network will be enhanced between now and 1985 to accommodate digital end-to-end services, "local-area data transport capability" and "data bridging

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Details on Subsidiary Released

Baby Bell's First Offering: ACS

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The first offering of "Baby Bell" will be AT&T's long-delayed Advanced Communications Service, the company's plan for an all-embracing data communications network service. Plagued with developmental problems since its announcement three years ago, ACS had been presumed by many outside observers to be a lost cause.

Word of ACS' resurrection came last week as AT&T unveiled details of the separate subsidiary it must set up to offer unregulated DP/telecommunications services and equipment under the Federal Communications Commission's recent Second Computer Inquiry ruling.

With an initial capitalization of $59 million in cash and plant and projected expenditures of more than $550 million for start-up and the first four years of operations, Baby Bell — as the subsidiary has been dubbed — gets AT&T into the unregulated world in a big way, even though it is just the beginning of the company's unregulated ventures.

The company said the subsidiary, if approved by the FCC, will be set up by June 1, 1982 and will begin offering customer equipment and services by Jan. 1, 1983.

Under its Computer II rules, the FCC directed AT&T to submit its capitalization plan 180 days before the subsidiary begins operations. However, in its submission last week the company requested its plan be approved within 120 days. AT&T Vice-President James S. Billingsley told the commission the company wants to make ACS available to customers "as soon as possible."

Opponents of AT&T's entry into the unregulated services area, on the other hand, see a more sinister motive behind the request for accelerated consideration. Jack Biddle, president of the Computer & Communications Industry Association (CCIA), for one, surmised that AT&T is trying to make the subsidiary "a

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Magnuson Adds Two CPUs To Rival 4300 Groups 10, 11

By Tim Scannell
CW Staff

SAN JOSE, Calif. — Magnuson Computer Systems Corp. has countered IBM's recent 4300 announcements by introducing two machines that are said to offer 10% more performance for 10% less cost than the IBM 4331 Group 11 and 4341 Group 10 computers.

The manufacturer of IBM plug-compatible mainframes (PCM) also dropped prices on its previous systems by up to 16% and launched a 12-month warranty program that offers free computer maintenance to customers that purchase their machines.

Magnuson's newly announced M80/30E and M80/41 processors are built around the firm's M80/3X CPU, but reportedly incorporate a number of software microcode changes that boost the computers' performance capabilities. The M80/30E is similar to the firm's entry-level M80/30 computer and has a maximum main memory of 8M bytes and up to eight data channels. This compares with a maximum memory of 2M bytes and two channels on IBM's 4331-11 machine.

Like other members in the M80 family, the 30E has a machine cycle time of 100 nsec, a modular design and a high-speed bus architecture that connects the computer's major

(Continued on Page 8)

Intelligent Performance Monitor Analyzes CICS Response Hitches

By Lois Paul
CW Staff

LOS ANGELES — An intelligent performance monitor that analyzes CICS response time problems for users of IBM and plug-compatible mainframes was announced here today by Candle Corp.

The Exception Slow Response Analyzer (Esra/CICS) searches for CICS response time problems and then tries to analyze why the problems are happening, Candle said. The software package periodically checks actual performance against user-specified response time standards for CICS transactions or groups of transactions, automatically invoking a detailed degradation analysis, according to a spokesman.

This analysis breaks down response time into its significant components, such as CPU utilization, paging, I/O, CICS services and queuing for resources, he explained. Esra/CICS then logs the information and other performance indicators to hard copy; the resulting log shows the effect of each type of degradation reason on

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Conflict of Interest Costs L.A. DP Chief His Job

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — One of this city's top computing managers resigned from his job recently amid claims that he became entangled in a conflict of interest while overseeing the creation of a new municipal system.

Stanley Johnson's resignation came at the request of City Administrative Officer (CAO) Keith Comrie, who voiced disapproval of Johnson's decision to permit his wife to collaborate on a development project under his direct control. Although his wife's earnings from the development project in question totaled only $1,500, her association with the effort was apparently considered enough of an impropriety to warrant Johnson's immediate removal from his almost $55,000/year job.

"We have very strict conflict-of-interest codes here," Comrie said of the CAO's office, which serves as a policy consultant for the city's top government officials. "Our recommendations have to reflect the best interests of the community and nothing else. There can never be any hint that the actions of my office personally benefited either me or any member of my staff."

Despite his professional setback, Johnson still defends his decision to allow his wife's participation in a project for which he was responsible. "I just thought I was doing the right thing," he said. "Unfortunately, in the civil service, there are sometimes a lot of hidden political agendas."

Until his resignation, the 47-year-old Johnson supervised the development of all the city's automated systems. His wife, Karen Johnson, holds a $39,000/year job as a programmer/analyst for the community's Department of Water and Power.

Shortly after leaving his post, Johnson was rehired by the city and assigned to another computing-related position in the General Service Department. At about the same time, the CAO named a permanent replacement for Johnson's former job slot, Comrie said.

Johnson's resignation resulted from his role in a $300,000 software development project aimed at automating the city's materials management system, most of which has been manual. When finally completed — a pilot installation is scheduled to begin operating in January or February — the on-line system is expected to

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No Dollar Amounts Set

AT&T Hit by NCR Antitrust Suit

By Marcia Blumenthal
CW Staff

DAYTON, Ohio — NCR Corp. has filed an antitrust suit against AT&T, charging the monolith with engaging in anticompetitive practices that prevent NCR from competing in the semiconductor and information processing markets.

The suit, filed Nov. 30 in U.S. District Court here, seeks to permanently enjoin AT&T from future conduct that raises barriers to entry or restrains competition in the domestic or export markets for semiconductors and information processing equipment.

Also named as defendants in the suit were Western Electric Co., Bell Telephone Laboratories, Inc. and Ohio Bell Telephone Co.

Although the suit is very broad in scope, it alleges that AT&T's anticompetitive actions have caused NCR to lose sales and profits in those markets. Although NCR has not yet set a dollar amount for its alleged losses, a spokesman said the firm would disclose such a figure prior to the start of the trial.

Unfair Agreements

NCR charged that it has been excluded from freely competing in those markets through unfair technological licensing agreements among the defendants and selected outside organizations. Although IBM was not named as a defendant, NCR's suit charged that Western Electric licensed, royalty free, certain patents to IBM, but not to other third parties, including NCR.

In addition to antitrust charges, NCR's suit alleged that AT&T companies had infringed on four of its patents related to information processing systems, the NCR spokesman said.

The patent infringement portion of the suit was, in part, a response to a similar suit filed against NCR last August by Western Electric that alleged NCR had infringed on four Western Electric patents related to semiconductor technology.

AT&T has denied all NCR charges.

Good News for MIS Managers: A Quarterly on Office Automation

Computerworld has good news for management information systems managers confronting the office automation explosion. Not only is CW's biweekly Office Automation section going weekly, but a new publication devoted to OA will debut next year.

The weekly OA section, edited by Senior Editor Bruce Hoard, will emphasize the integration of word and data processing and those products and services supporting that integration. Word processing, text editing, store-and-forward systems, electronic mail, standalone word processing, word processing software for CPUs and integrated facsimile will all be covered in the section.

The section will also include application stories, office issues, tutorials, research studies and integration strategies.

The first issue of *Computerworld OA*, a quarterly publication that will be sent free to *Computerworld* subscribers, will appear March 31. The publication will take an in-depth look at the rapidly changing industry and the management and technological strategies needed to implement office automation in a department or an entire organization, according to its editor, Ann Dooley, the former editor of CW's Office Automation section and a member of the CW reporting team for six years.

Anyone interested in contributing to the first issue of *Computerworld OA* can reach Dooley at CW Communications/Inc., P.O. Box 880, Framingham, Mass. 01701.

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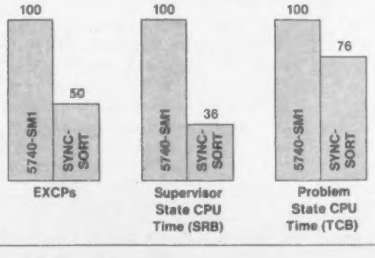

Ladies and gentlemen...distinguished guests...voters: As we stand here before you on the victory platform — for the fourth year in a row — we are both proud and humble.

We're proud that SyncSort OS has just been re-elected to office as America's most popular sort program. The latest sort survey of the International Data Corporation reveals that SyncSort is now the "people's choice" of 73% of America's OS and OS/VS users.

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- 50% in EXCPs;
- 64% in Supervisor State CPU Time (SRB);
- 24% in Problem State CPU Time (TCB).

2. **The best in programmer productivity.** We never forget that programmers are voters, too. so we've made SyncSort about as "programmer friendly" as a software product can be. We've included these and other features to reduce the "human-intervention" factor:

- INCLUDE/OMIT — chooses records to be sorted.
- SUM — summarizes designated numeric fields.
- INREC/OUTREC — reformats records on input and output.

The use of these features can reduce the programming time required for a simple application from five programmer days to one programmer day.

3. **The best service to the electorate.** We never forget who's boss. We work for the voters, they don't work for us.

When our Technical Service people get a call, they follow it up fast and accurately. About 85% of all requests for assistance or sorting advice are resolved within 24 hours.

Since the IDC sort surveys were begun in 1977, SyncSort OS has increased its share of the vote from 43% to 73%. And our popularity with MVS users has grown accordingly. Today, 80% of America's MVS users cast their ballots for SyncSort.

If you'd like a copy of the latest sort survey, give us a call. No computer library should be without it!

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Top Baby Bell Exec Blasts Wirth for 'Overkill'

By Phil Hirsch
CW Washington Bureau

NEW ORLEANS — James E. Olson, who will head "Baby Bell," AT&T's unregulated subsidiary, said last week that Rep. Tim Wirth (D-Colo.) is guilty of "overkill" when he insists on barring the subsidiary from owning transmission facilities.

Olson, a vice-chairman of AT&T's board, was interviewed here after he delivered a speech at the 1981 National Telecommunications Conference (NTC '81). Stating that he "understands" the public's concern about Bell possibly cross-subsidizing its competitive activities with earnings from regulated services, Olson added that "my understanding ... begins to fade when proposed safeguards become an

CW At NTC '81

'overkill' — when they are designed not merely to assure againt cross-subsidy or unfair competitive advantage, but rather to vitiate [Bell's] innovative abilities or simply to keep us from competing."

When asked for an example of such "overkill" during the interview, Olson cited the proposal to bar Baby Bell from owning transmission facilities. The most recent statement of this idea was in a massive report on competition prepared by the majority staff of the House of Representatives Telecommunications Subcommittee, headed by Wirth.

The subcommittee has been drafting a bill to replace the Communications Act of 1934. The legislation, which is expected to be unveiled shortly, will be an alternative to S. 898, the Communications Act rewrite passed by the Senate late last summer.

Ridiculous Belief

In last week's interview, Olson called it "ridiculous" to believe AT&T's position on the transmission facility ownership question is based on a secret desire to free some of its basic services from regulation. This has been one argument of Bell's opponents — particularly organizations representing specialized carriers and large corporate telecommunications users.

They insist that if the Bell subsidiary is allowed to own circuits instead of being required to lease them at tariffed rates from the regulated side of the Bell system, the subsidiary will be able to develop unregulated "clones" of regulated offerings. The latter will then be allowed to degenerate, according to this argument, forcing users to leave the rate and service protection afforded by the Federal Communications Commission (FCC) regulatory unbrella and migrate to the subsidiary.

Olson, pointing out that all of the subsidiary's prospective competitors are free to build and own their transmission facilities, argued that it would be unfair to impose an ownership restriction only on the AT&T affiliate. "If the object of turning to the market is to provide the public with the very best technology, at the best price, regardless of source, then it hardly pays to prevent the Bell system from doing what it has done quite well: innovating," Olson said.

Innovation, he added, is particularly necessary now because of the "lagging and sagging" rate of U.S. productivity and the need to increase U.S. exports.

Baby Bell to Provide ACS

(Continued from Page 1)

fait accompli" before Congress can complete its restructuring of the telecommunications industry or before several lawsuits involving AT&T can be resolved.

The CCIA is fighting the Computer II ruling here in federal court, and the association last week filed a motion for an expedited decision in that case. Biddle suggested that the AT&T attempt to get the subsidiary up and running as soon as possible may be seen by the courts as a response to that lawsuit and the antitrust action against the company brought by the Justice Department.

Billingsley assured the FCC the proposed structure of the subsidiary is "fully responsive to the commission's requirements for fully separate subsidiaries. Our intent is to demonstrate that there will be no opportunity for cross-subsidy or anticompetitive advantage flowing to the subsidiary from any Bell system affiliate."

Opening Balance Sheet

According to AT&T, the subsidiary's projected "opening balance sheet" includes a cash advance from AT&T of $3 million working capital and $56 million worth of physical assets — communications processors, computers, furniture and so on — transferred from AT&T.

The company said no Bell company other than AT&T will provide capital to the subsidiary and that all plant to be transferred was purchased specifically for ACS.

In addition to that $59 million, AT&T said the subsidiary will reimburse Bell operating telephone companies and the AT&T Long Lines Division for approximately $134 million in services needed to get ACS up and running by the beginning of 1983.

The company estimated an additional $434 million will be needed by the subsidiary to operate ACS for the four-year period 1982-1985. The subsidiary will issue common stock to AT&T for all the assets.

With an initial staff of about 850 people — many of whom the company said have been involved with ACS development — the subsidiary will probably set up headquarters in central New Jersey, an AT&T spokesman said.

AT&T Moves to D/A Net

(Continued from Page 1)

capability."

The newly announced interface was designed to implement the first of these three capabilities and will connect customer-provided terminal equipment with network channel terminating equipment (NCTE) — a modem-like device installed adjacent to the terminal.

The NCTE converts an analog local loop, on an alternate basis, into a full-duplex 56K bit/sec digital channel between the user's site and a telephone company central office equipped with a No. 1A or No. 4 electronic switching system (ESS).

To set up a data call, the user will punch a special code into his Touch-Tone telephone, along with the number of the called party, then activate the NCTE by means of a switch next to his phone. The extra digits will tell the central office to route the call through the network via digital rather than analog circuit links, Handler explained.

Applications for circuit-switched digital capability include bulk rate data transfer, secure voice, facsimile, backup for private lines and occasional access to packet-switched networks, Handler said.

Second Capability

Local-area data transport capability, the second network enhancement, was designed to connect interactive home and business information services — that is, videotex — and telemetry services, such as burglar alarm monitoring, to the network. Its key feature is a statistical multiplexer at the telephone company's central office.

Customer access to this multiplexer could be provided by a standard analog circuit, Handler explained. Using a modem, a data terminal would send and receive packetized messages to and from a particular port on the multiplexer. Alternatively, the channel could simultaneously transmit voice and packetized data by adding frequency-based channel subdividing equipment at either end of the local loop.

Handler indicated AT&T has developed equipment that allows up to 8,000 bit/sec data transmission simultaneously with voice communication over a standard two-wire local loop. The data stream occupies "the frequency spectrum above the voice," he explained.

When these two message streams reach the multiplexer, the voice information is routed to one port and the data to another, Handler added. The former information is then fed into the voice telephone network through an electronic switching system, while the data is converted into X.25 format for delivery to a non-telephone-company packet network or terminal.

Data Bridging

The third capability, data bridging, was designed for teleconferencing and similar situations where there is a need "to transmit digital data from one location to many terminations," Handler said.

The key element here is the No. 4 ESS; it would route data received from a single input station to multiple receiving points. The input could be received over standard analog local loops at 4,800 bit/sec or at 8,000- or 56K bit/sec using similar facilities modified as described above, he said.

"Over the long term," Handler added , "as the technology can be economically deployed, the circuit and packet-switched network, along with the various access schemes, will merge into a single integrated services digital network.

At that point, a digital access with variable bandwidth assignment will be provided for customers, and the network will have centralized intelligence for routing and control in order to provide the optimal transport for any particular application."

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Service Does Not Exist Yet

ACS: Will It Be Baby Bell's Problem Child?

By Brad Schultz
CW New York Bureau

AT&T's Advanced Communications Service (ACS) does not exist yet. The common carrier's announcement that ACS will be the first product offering of a new separate subsidiary may be wishful thinking, but a lot of users and vendors — not just AT&T — are doing the wishing.

A July 10, 1978 petition from AT&T to the Federal Communications Commission (FCC) gave the world its first official description of ACS, a switched data communications service for both digital and analog facilities.

However, that description and subsequent announcements on ACS have only suggested what the service will do, not how it will be done.

AT&T engineers and systems developers have spent years and millions of dollars in trying to decide how it will be done. Initial plans called for implementation of a few ACS network nodes by 1979, subject to FCC approval, and up to 100 nodes by 1985.

'Software Problems'

But Bell was forced to admit in February 1979 that "software problems" were delaying ACS availability. Expert observers have suggested that these problems reflected strife among ACS developers and poor coordination of the many ACS development projects Bell had going.

When ACS planning began in the 1970s, AT&T management was more rooted in the telephone business and more harassed by the FCC and U.S. Justice Department than now, so last week's announcement that a "Baby Bell" — as the new subsidiary has been popularly termed — would be born as the vendor of ACS was a milestone in telecommunications history.

ACS will radically change the industries associated with information processing, experts predict, because it will allow users to interconnect otherwise incompatible terminals and processors and to receive a wide range of projected Bell services, possibly undercutting presently popular specialized carriers.

June Birthday

AT&T spokesmen said last week that Baby Bell will be born by next June 1 and be delivering "enhanced" services by Jan. 1, 1983. The FCC, which monitors the way AT&T finds money to spend on computer-related services, will decide whether AT&T may line Baby Bell's cradle with a $3 million cash advance, $56 million in physical assets and another $434 million earmarked for ACS operations, the spokesman said.

Notwithstanding the Justice Department's antitrust prosecution of AT&T, which may generate a lower court verdict next summer, the FCC may indeed sanction such enormous capitalization, conceding in the wake of its Computer Inquiry II final decision that the world's largest telecommunications supplier must loom large in the computing marketplace as telecommunications and computing technologies inexorably merge.

In recent weeks, AT&T executives have signaled the advent of coast-to-coast all-digital networking by 1984, implying that information processing users can count on Bell to carry bulk data transfers, electronic mail, store-and-forward messages, public data base retrieval and other traffic with much less need for modems along the way [CW, Nov. 16].

All this will happen under the rubric of ACS, which seemed dead to some Bell watchers only a year ago, making certain weaknesses of IBM's Systems Network Architecture (SNA) quite obvious.

SNA, experts maintain, pressures users into dependence on IBM terminals, while ACS would allow organizations with IBM mainframes to latch together virtually any commercially available brand of terminal.

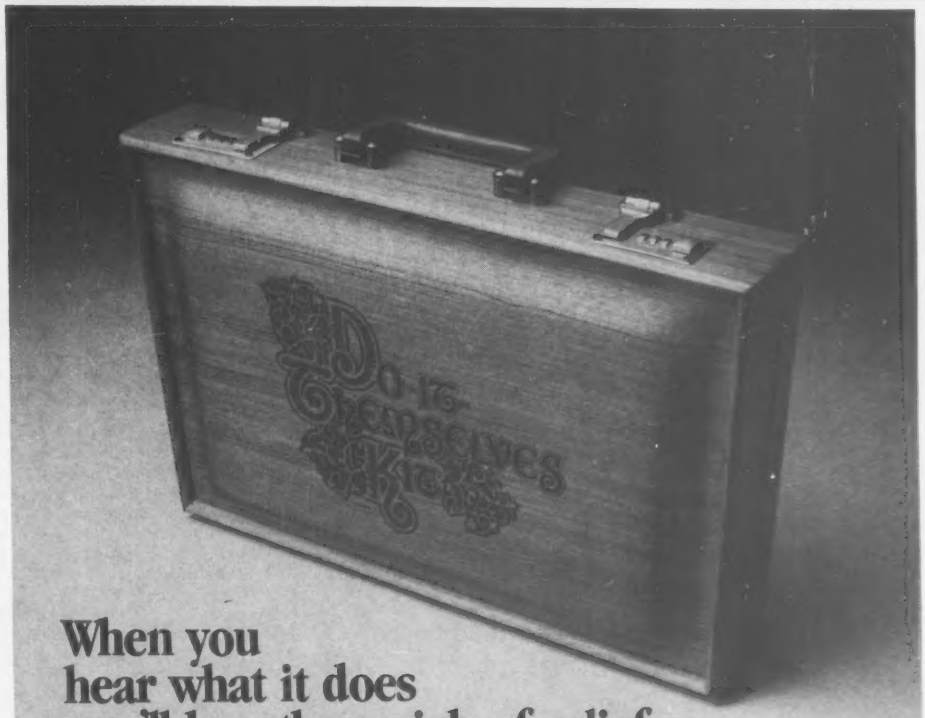
Analysis

AT&T, according to some reports, already runs internally an ACS prototype featuring the X.25 protocol for links between terminals and public data networks.

IBM 3270 terminals have long been sold without X.25 compatibility, but the mainframe vendor promised earlier this year to provide X.25 soon. For years, IBM spokesmen had said their company would not deliver X.25 before Bell did.

It thus seems likely that ACS will feature X.25 and offer the protocol conversion necessary for IBM systems to smoothly tap the systems made by other vendors.

With ACS, data will zip along at 56K bit/sec between nodes planted in major cities. According to some Bell watchers, the projected service will rival the services of Satellite Business Systems, which IBM partly owns, and seriously compete with the value-added networks of GTE Telenet Communications Corp. and Tymnet, Inc.



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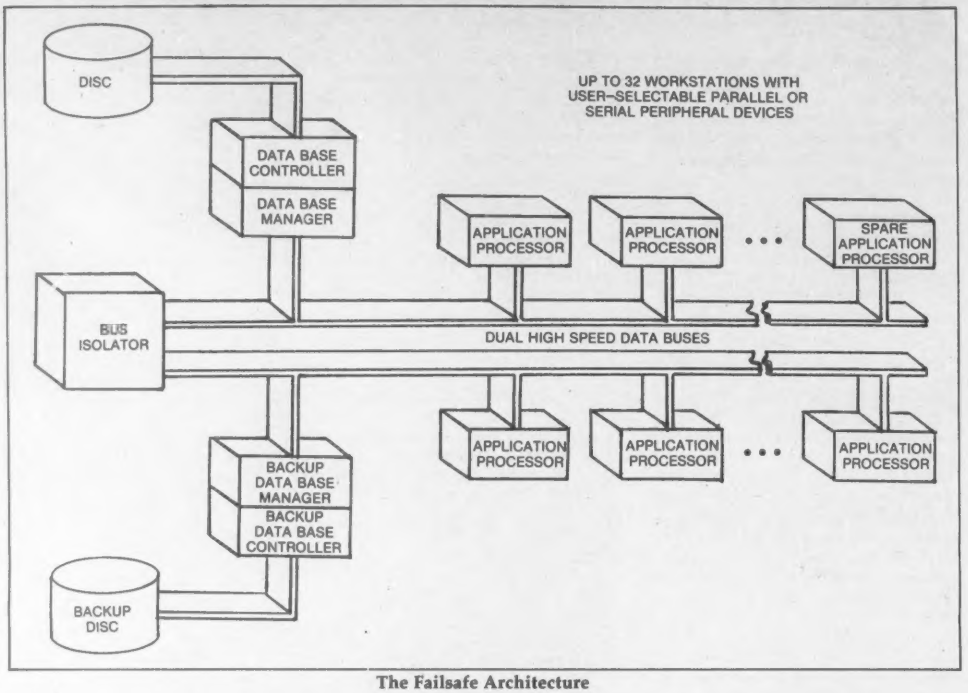
Dosc Debuts Redundant Transaction Processor

By Lois Paul
CW Staff

ALBERTSON, N.Y. — A redundant transaction processing system for on-line applications which combines distributed multiprocessing workstations and an automated means of structured software development was unveiled here last week by Dosc, Inc.

The major features of Failsafe, as the system is called, are a parallel architecture intended to prevent downtime, protect against loss of data and provide faster on-line response time; and a software development methodology designed to automate and enforce structured software development techniques.

The hardware/software system was designed for on-line transaction processing applications, according to the vendor. It can reportedly be used on a stand-alone basis or as a front-end processor to any system that is compatible with its RS-232 interface.



The Failsafe Architecture

Computer and Software

The Failsafe system includes the Failsafe MT-85 computer, a distributed multiprocessor workstation with continuous processing capability and the Failsafe Software Development System (FSDS), which is used by customers as a tool to develop applications software.

Each Failsafe MT-85 computer is implemented as a distributed processor containing a host processor and up to 16 identical processing elements, the vendor explained. These consist of single-board microcomputers that share access to a large central data base via high-speed data buses. Up to 32 workstations can be supported. The system includes a fully redundant data base, dual high-speed data buses, dual power supplies and dual printers.

The redundant hardware features are supported by the Failsafe system's data base management software, Dosc reported. All transactions and data base changes are logged automatically and data base updates are written automatically both to the primary and backup disks.

Backup for the individual computers in the Failsafe system is provided by the inclusion of one or two "hot spares," rather than a complete dual processing system, the vendor said.

Development System

The Failsafe Software Development System is a structured software development tool that is reportedly applicable for all types of program development. Specifications for programs are written in a high-level language called Structured English.

Using this software development method, a systems analyst breaks down an application into a top-down hierarchy. Once this is defined on paper forms, the vendor said, a programmer with minimal experience can define each part of the program in terms of "minispecs" written in Structured English. The minispecs are then translated into Pascal P-code to run on the Failsafe system.

The separate programming tasks are assigned to individual microcomputers, the vendor continued. User and system documentation are generated automatically. Minispecs drive the entire process of program coding and documentation.

A three-day training program given by the vendor is said to enable even entry-level programmers to write minispecs for the Failsafe system.

Workstations in the Failsafe system run under a single-task operating system based on CP/M. Each drives its own I/O interfaces. In addition to Structured English, the Failsafe system supports Pascal, assembly language and microcode.

The basic system is priced at $79,400 and includes two 80M-byte disks, two 16M-byte disk cartridges used for data base backup media; two data base manager computers; two data base controller computers; two 200 char./sec printers; dual power supplies and cabinets; one supervisor station; one workstation; Failsafe operating software; and a printer spooler. The monthly maintenance charge is 1% of the hardware cost.

The Failsafe system is geared toward applications in banking and securities (on-line retail banking operations); manufacturing (factory management systems); insurance; systems houses and OEMs; distribution and purchasing, retail sales and general business.

Dosc, Inc. is located at 185 I.U. Willets Road, Albertson, N.Y. 11507.

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L.A. DP Chief Now Out of Job

(Continued from Page 1)

save millions of dollars by allowing the city to consolidate its supplies inventory, which includes items as diverse as auto parts, paper and custodial materials.

The main contractor in the project is a small area firm named Distributed Data Systems, Inc. As the materials management system neared completion, the contractor found itself unable to hire an adequate number of programmers and approached Johnson with a proposal to allow his wife to work on the project in her spare time.

Johnson approved the suggestion and failed to report his decision on his conflict-of-interest statement, Comrie said.

Johnson's wife unquestionably did the job she was paid to do and was compensated at the standard rate, but even though her services benefited the systems development effort, her participation in the project still constituted a conflict of interest, the CAO chief said.

By allowing his wife to collaborate with him on the contract, Johnson received a family income from the project, rather than just a single salary, Comrie explained.

To Link Incompatible DP Gear

Vendors Testing Pentagon Network Protocols

By Brad Schultz
CW New York Bureau

WASHINGTON, D.C. — Several software houses have tested and may soon offer Pentagon-sponsored data network protocols believed to allow smooth links between otherwise incompatible brands of computer equipment.

Processors manufactured by IBM, Digital Equipment Corp., Honeywell, Inc., Control Data Corp., Hewlett-Packard Co. and Perkin-Elmer Corp. are involved in tests of the Defense Department's Transmission Control Protocol (TCP) and Internet Protocol (IP), according to research community correspondence.

Both the military and commercial DP communities face the same grievous problem these protocols are meant to resolve: awkward data transfers across multivendor networks.

According to an expert observer, TCP/IP will be widely offered to commercial users within the next year. The protocol pair represents an attractive alternative to IBM's Systems Network Architecture (SNA), he told *Computerworld*, because SNA allegedly locks users into virtually sole-source dependence on IBM.

Rave Reviews

The correspondence extracted from the Defense Advanced Research Project Agency's (Darpa) Arpanet, a packet network available to most scientists who work under Pentagon grants, contains rave reviews of TCP/IP by people testing the protocols on certain popular computer systems.

One Darpa official told Arpanet subscribers "I believe TCP/IP to be the most thoroughly tested and widely implemented multinetwork protocol ever built. It is a crucial component of future [Defense Department] command and control systems. People participating in this transition of the Arpanet into the internet environment are participating in an event as exciting as the construction of the Arpanet, and I am very proud to be a part of it."

Arpanet was the first packet-switched network and is commonly used by professors, graduate students and research scientists as a means of communicating research results and collaborating on research papers. As an electronic mail medium, Arpanet has chronicled the testing of TCP/IP, which in turn may transform Arpanet into a so-called internet — a network of networks.

Presently, the great majority of Arpanet-attached computer systems are DEC mainframes under operating systems such as Tops-20, Tenex and Unix. So the thrust of TCP/IP development basically is to provide easy traffic flow from DEC-based networks to networks based on other brands of mainframes.

According to a May 15 Arpanet communique, Digital Technology, Inc. plans to market TCP/IP as part of its VAX/VMS network software package for DEC's VAX-11/780 and 750 computers. Written mostly in C, the language developed by Bell Laboratories, Digital Technology's TCP was said to entail 27K bytes of object code, 46K bytes of buffer and table space and 15K lines of source code. The vendor's IP was said to entail 14K bytes of object code, 24K bytes of buffer and table space and 7K-byte lines of source code.

Bolt, Beranek and Newman, Inc., the prime contractor for Arpanet software during the packet net's construction, was said in a May 14 communique to be polishing a TCP/IP implementation for Hewlett-Packard's HP-3000 supermini.

At the University of California in Los Angeles, TCP/IP implementations are being readied for the IBM 360 and 370 mainframe families, the Arpanet correspondence declared. SRI International, Inc. in Northern California has meanwhile tested TCP/IP on various DEC systems.

'Both the military and commercial DP communities face the same grievous problem these protocols are meant to resolve: awkward data transfers across multivendor networks.'

TCP/IP rests atop the X.25 protocol layer recommended by the Consultative Committee on International Telephone and Telegraph as a standard for links between terminals and packet-switched networks, an informed source told CW. Without TCP/IP, the common carrier can control opening and shutting of such links, he maintained.

With the Pentagon's protocol pair, users gain this control, obtaining a better grip on communications costs, he added.

Vendors will need to feature TCP/IP in systems sold to the Defense Department, the expert predicted. During the Reagan administration's massive buildup in defense spending, few vendors will avoid developing TCP/IP compliance or purchasing it from software houses, he said.

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Subcommittee Raps Reagan Global Info Policy

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Under increasing congressional pressure to better coordinate international communications and information policy, the Reagan administration received another round of abuse last week from a House of Representatives subcommittee long dissatisfied with government response to these international issues.

Complaining of "bureaucratic bickering and half-kept promises," Rep. Glenn English (D-Okla.), chairman of the Government Information and Individual Rights Subcommittee, accused the State and Commerce Departments and the U.S. Trade Representative's office of "business as usual" and paying only "lip service" to the needs of the U.S. business community.

Strong Defense

Representatives of the three agencies strongly defended their actions since the beginning of the administration. They claimed departmental reorganizations and commitments of new resources to the problems of American DP and telecommunications services firms and to the subject broadly termed "transborder data flow" have put the government in a much better position to champion free international trade in those areas.

Deputy Commerce Secretary Joseph R. Wright Jr., for example, said that through the work of the Cabinet trade council, Trade Representative William Brock, State Secretary Alexander Haig Jr. and Commerce Secretary Malcolm Baldrige now speak as one on international communications and information issues.

The three are "thoroughly consistent" in their policy declarations, according to Wright, who called this development "unique." The three departments no longer are bogged down in turf battles, and "our working relationships are much better than I thought they would be" at the beginning of the year, he said.

Similarly, Undersecretary of State James L. Buckley outlined for the subcommittee the State Department's internal reorganization to bring more manpower to bear on international communications and information. He called these "initial undertakings" successful and pledged further efforts along the same lines.

English, however, was clearly not impressed. Zeroing in on a State Department steering committee that coordinates the activities of various offices on these issues, English called it "a phantom committee" because it has held no formal meetings.

When assured the committee members confer on a regular, if informal, basis, English retorted there is little benefit from a steering committee if all its members do is "shoot the bull . . . around the water cooler."

The subcommittee chairman praised the Commerce Department for its handling of U.S. response to the privacy guidelines developed recently by the Organization for Economic Cooperation and Development, bu' said he is afraid that was an exception to U.S. government action and not the rule.

English expressed concern over a number of recent events and trends — including possible West German moves to eliminate use of private leased lines in that country and the possibility Mexico will restrict use of remote DP services from outside the country.

Despite the U.S. government's claims to better organization for responding to these types of events, English said "there really doesn't seem to be any response when these barriers are erected." He accused the government officials of vacillation, uncertainty and "thumb twiddling."

Acting Assistant U.S. Trade Representative Richard R. Self told the subcommittee that "all governments are somewhat at a loss as to how to proceed or what the implications of particular actions might be."

Magnuson CPUs Rival Latest IBM 4300s

(Continued from Page 1)

components. Unlike its predecessors, however, the 30E is slanted more to a scientific than to a business environment.

"IBM is opening up a new marketplace for the 4300 and compatible machines — the scientific arena," Bruce Moore, Magnuson's product marketing manager, observed. The PCM firm sees IBM's newest 4300 targeted more toward this scientific marketplace and against machines like Digital Equipment Corp.'s VAX-11/750 and 11/780 processors. "We think there's a market there, too, and want to take advantage of it."

Entry-Level 40 Series CPU

The M80/41 represents a new entry-level step into Magnuson's 40 series general-purpose large-scale computers. Like other members in the line, the 41 has a maximum main memory of 16M bytes and has up to 14 data channels. These figures compare with a maximum memory of 4M bytes and up to six data channels offered on IBM's recently announced 4341 Group 10 processor.

The M80 computers all support a variety of IBM operating system software including DOS, DOS/VS, DOS/VSE, VM370 and MVS. In addition, because all of its processors are "soft machines," or heavily dependent on internal software, any changes IBM or third-party vendors make to the operating systems can be adopted by Magnuson via changes in the systems' microcode. These changes are usually supplied on a floppy diskette that can be downloaded to the main disk, according to Moore.

All of the M80 processors, including the 30E and 41, are directly upgradable to processors in the same or a higher series, he added.

The M80/30E costs $104,000 while the Model 41 is priced at $163,000. Two-year lease packages on the 30E and 41 systems are priced at $3,748/mo and $6,900/mo, respectively. Both systems are scheduled for delivery next month.

Price Cuts, Free Upkeep

In order to "maintain price performance advantages over equivalent IBM processors," and keep up with IBM's recent price cuts on its 4300 Series computers, the firm dropped prices on its previous M80 models from approximately 12% to 16%.

The entry-level M80/30 now costs $86,050, down from about $93,900; the previous entry-level M80/42 costs $183,000, cut from about $210,000. Other revamped system prices are $116,000 for the M80/31, $146,000 for the M80/32, $183,000 for the M80/42, $228,000 for the M80/43 and $290,000 for the M80/44.

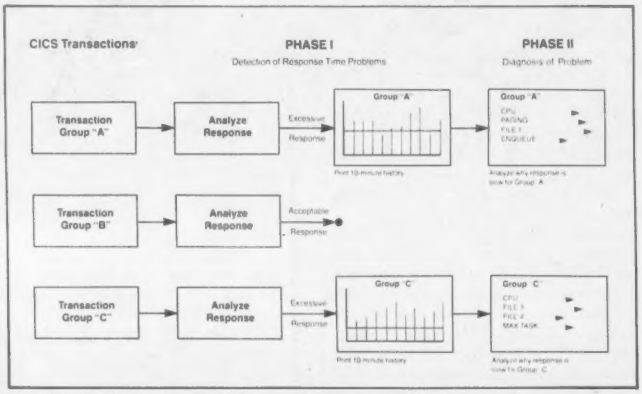
Lease prices are not affected by the new pricing, which went into effect on Dec. 1.

Finally, to bolster purchase sales, Magnuson is offering 12 months free maintenance to computer buyers.

"With the recent price reductions, there will be a lot of focus on purchase business," Moore said. "And we wanted to be aggressive on both pricing and maintenance," he continued.

Presently, Magnuson has about 350 processors installed worldwide, most of them in commercial business environments.

Unit Analyzes CICS Response



Esra/CICS analyzes which transactions are 'bad' in terms of response and diagnoses the problem, Candle said.

(Continued from Page 1)

response time to speed up problem determination.

The vendor claimed that Esra/CICS combines features of background and foreground performance monitors. It can capture more detailed data than is practical with a background monitor, Candle said, because it is active only when a problem is occurring.

Systems programmers using Esra/CICS rather than an interactive foreground monitor can diagnose CICS performance problems even if they are absent when problems occur.

Esra/CICS is available on a permanent license basis for $19,500. The performance monitor can be used on IBM 370, 30 series and 4300 processors and plug-compatible mainframes running under MVS, MVS/SE, SE2, SP1, SP2 and SP3. Candle claimed it can be installed and operational in less than an hour and does not require supervisor call instructions or authorized libraries.

Candle is headquartered at Suite 2404, 10880 Wilshire Blvd., Los Angeles, Calif. 90024.

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California Thieves Swipe Chips Worth $2.7 Million

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — Thieves circumvented a chip maker's security safeguards during the Thanksgiving holiday and helped themselves to a small truckload of integrated circuits worth an estimated $2.7 million.

The theft involved nearly half-a-million highly advanced logic and memory devices and took place in a Monolithic Memories, Inc. warehouse bristling with sophisticated electronic security equipment.

Exactly who swiped the chips and how the heist was accomplished is still under investigation. But the size of the haul, the technological sophistication of the loot and the professionalism of the thieves have led to speculation that the theft may have been the work of international black marketers, who are believed to be supplying the Soviet Union and other foreign powers with millions of dollars in illicitly obtained semiconductors.

Monolithic Memories is offering a $50,000 reward for information leading to the thieves' arrest and conviction.

The target of the Monolithic Memories theft was four to five dozen crates of programmable array logic chips and first-in/first-out memory circuits, which had already passed final inspection and were ready for shipment. Considered state-of-the-art technology, the stolen devices have potential applications "in almost anything you could think of — industrial control equipment, military computers, video controllers, home computers and electronic games," according to Ray Gouldsberry, the company's corporate communications director.

On the day before Thanksgiving, the devices underwent a routine inventory and then were locked inside a steel mesh cage to which only a few Monolithic Memories employees have the key. The cage sits inside a warehouse, all of whose entrances are equipped with motion-sensing devices for detecting unauthorized entries.

At the main entrance, 24-hour security guards monitor the building's interior through closed-circuit television.

Inside Job?

Despite its elaborate security precautions, however, the semiconductor manufacturer was still unable to prevent the theft of its chips, which were discovered missing on Nov. 30, the first working day following the long Thanksgiving weekend.

"The amount of the theft leads us to believe the scheme involved more than just one individual," Gouldsberry said. "We also have some reason to believe the theft may have been an inside job, partly because the warehouse where the circuits were stolen showed no sign of forced entry."

As part of their investigation into the crime, local law enforcement authorities are questioning Monolithic Memories' security guards and some of its other employees as well, Gouldsberry said. The case has also attracted the attention of the Federal Bureau of Investigation, which has joined the probe.

Food Stamp System Expected To Save Michigan $500,000/Year

DETROIT — The Michigan Department of Social Services in Wayne County here is using a new on-line, computerized food stamp issuance system that is expected to save the state nearly $500,000 a year after a payback period of about two years.

The system, designed and installed by Burroughs Corp., cost about $560,000 to develop and implement, according to David Wigent, deputy director of the State Department of Social Services Office of Food Programs. He said that directors of food stamp programs in other populous urban Michigan counties are considering implementing the system within the next fiscal year.

The on-line system consists of 67 Burroughs TT 650 transaction terminals and 67 Burroughs AP 310 tabletop printers installed at food stamp issuance sites in the county. Each site has one or more pairs of TT 650/AP 310 terminals communicating with a Honeywell, Inc. Level 66 DPS 5 host computer in Lansing, the state capital. Twelve pairs of terminals are being held in reserve to meet program expansion needs.

The on-line system is assisting members of some 176,000 households in obtaining free food stamp coupons under the federal food program. The system can validate eligibility, automatically generate an authorization-to-participate (ATP) card and post each client's transaction to the computer.

Plastic participation cards that activate the system resemble credit cards and are embossed with the client's name and case number. Information in the card's magnetic stripe is read by the transaction terminal and transmitted to the host computer for a check against stored records. If an authorization is granted, it is printed automatically on the AP 310 at the food stamp site. The client signs the authorization and is given food stamps.

The computer logs each transaction, preventing clients from obtaining an authorization at another food stamp center in the same month.

Wigent said the new system, installed in July and implemented Sept. 1, will ease the implementation of federal program changes, enhance accountability, significantly reduce both client and worker errors and reduce the incidence of fraud.

Wigent said the system will save the state approximately $32,000/mo just on the postage required for mailing paper participation cards to Wayne County households and will save approximately $1,000/mo spent on paper to produce the cards.

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No Natural Pathway Seen to MIS Chiefdom

By Brad Schultz
CW New York Bureau

HUNTINGTON BEACH, Calif. — Management information systems (MIS) integrate data processing, word processing and telecommunications, but a background in DP, WP or telecommunications management does not prepare anyone for a position as MIS executive.

So said Einar Steffereud, president of Network Management Associates, Inc. here, who advises companies and government agencies (including the Defense Department) on how to implement MIS. The former data center manager writes and lectures widely on electronic mail and teaches part-time at the University of California at Irvine.

Should DP managers become MIS executives? In a recent interview, Steffereud declared that DP managers typically lack insight into the needs and attitudes of office workers. Many have no experience with WP and limited involvement with telecommunications, he added.

WP Managers

Should WP managers become MIS executives? Where office automation does not exist yet, WP managers are supervisors of typing pools, Steffereud maintained, and lack any expertise in DP and telecommunications. Moreover, office systems are designed for operation by nontechnical personnel, so office automation is unlikely to make technical experts out of former typing-pool supervisors.

Should telecommunications managers become MIS executives? According to Steffereud, telecommunications managers typically understand telephones and what goes on in teletypewriter exchange rooms, but not much else pertinent to MIS. Telecommunications managers worry about their organizations' phone bills, which derive mostly from voice communications, not the data traffic routed among computer devices, he stated.

In short, there is no clear, natural pathway to the role of MIS executive. And those who wind up with such a job face serious political challenges as DP, WP and telecommunications factions square off or conspire among themselves, Steffereud said.

Actually, MIS — in the sense of full integration among computing devices, workstations and communications gear — is not commercially available, but should be soon, Steffereud asserted. Vendors have not provided links between electronic mail systems and processors, he explained. Users are still forced to transfer files manually by copying onto floppy disks, for example, and physically carrying disks from one machine to another.

The hangups stem mainly from protocol and interface incompatibility, the consultant pointed out. As vendors settle on protocol and interface standards, therefore, the issue of who should run MIS will be settled. Only then will MIS exist.

Report Studies Manufacturing

MINNEAPOLIS — A research report on computer-based manufacturing systems for use by corporate planners and management information directors is available from Info-Dyne, Inc., a research and consulting firm here.

The report addresses issues associated with the decision to install, change or upgrade such systems and provides guidelines for evaluation, selection and implementation, the firm said.

User experiences with various computer-based manufacturing systems modules are included as is information on suppliers of computer-based manufacturing system hardware, software and data services.

The report costs $2,500, but a free brochure describing the research methodology and scope of the report is available free from Info-Dyne, Inc., 1700 W. 78th St., Minneapolis, Minn. 55423.

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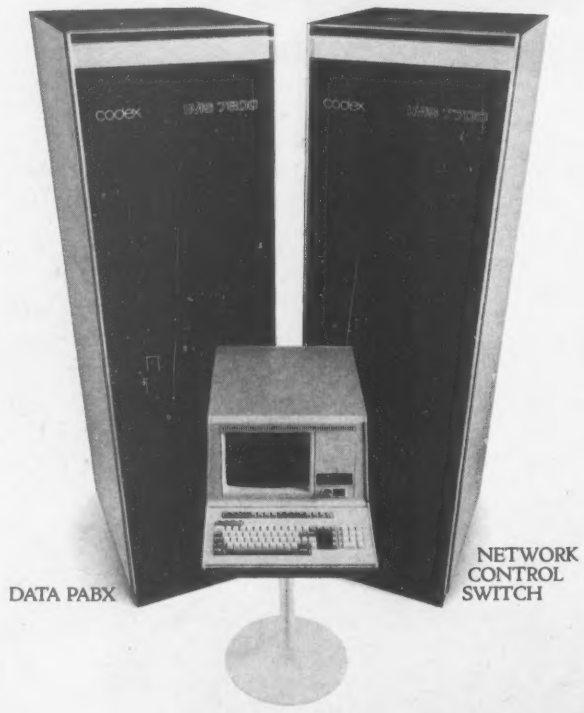

Described as Private-Sector CIA

Reporting Service for Multinationals Planned

By Jake Kirchner
CW Washington Bureau

ARLINGTON, Va. — Few new ventures built on state-of-the-art information technology have made such an immediate splash around the world as the newly formed International Reporting Information Systems (Iris).

Although still six months from formal start-up, this worldwide news gathering and analysis firm has already trumpeted its computer-based services on two continents and quickly caught the attention of some of the largest multinational corporations.

Widely described as a private-sector Central Intelligence Agency (CIA), Iris is backed by several large international financial institutions and counts among its board of advisors former British Prime Minister Edward Heath, former World Bank President Robert McNamara and Jean-Francois Deniau, a former French minister of trade and commissioner of the European Community.

Most important of all, according to Iris officials, the company is founded on the type of computer systems the CIA would like to have someday.

After 18 months of planning and testing, Iris was formally announced two weeks ago in London and last week at its headquarters in this Washington, D.C., suburb. According to company executives, the company will offer on-line news and analysis updated daily by a world-

(Continued on Page 12)

Iris Started at Banks' Urging

ARLINGTON, Va. — The brainchild of Anthony C. Stout, International Reporting and Information Systems (Iris) is the worldwide extension of Government Research Corp., Stout's 12-year-old company that publishes the *National Journal*, a highly respected Washington news and analysis organ. A group of international banks approached him a year ago and urged him to expand his operations to the international level, Stout said last week.

The financial community is not adequately informed of the political and economic events around the world that can affect multinational business operations, he maintained. As a result, according to Stout and his fellow Iris executives, international investment and commerce is stifled. Iris hopes to fill that gap with its on-line information services. The company explained that its correspondents and analysts will monitor events through standard journalistic practices, generating up to 10,000 messages a day including numerous items captured through optical character readers from newspapers, journals and wire services for input into the company's computer system.

Breadth of coverage and a far-flung staff will prevent any ingrown bias in reporting or interpretation of events from the viewpoint of any one country or culture, according to the firm. Its board of international political and business advisors will monitor operations to ensure the objectivity of Iris analysis.

"There are a lot of people out there who are trying to bend the story" to fit a certain ideology or audience, Stout said, whereas the Iris computer system will force the firm's analysts "to deal with all the information available about a given event."

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Start-Up Service to Report for Multinationals

(Continued from Page 11)
ide network of 96 political and economic correspondents and a headquarters staff of dozens of country specialists and analysts.

But what sets Iris apart from the many other data base services is not just high-powered financial backing and a supervisory board of international political and business luminaries, but its claim to the most sophisticated DP/telecommunications systems of its kind.

Based on an initial configuration of twin Burroughs Corp. Model 7800 mainframes, 6M bytes of main memory and 6G bytes of on-line disk storage, the system was designed by a staff of experts Iris claimed is already responsible for some of this country's most sensitive intelligence and defense systems.

Clients will access Iris data bases through on-site terminals and periodic publications, as well as through direct consultation with company analysts. Information will be produced on country background, economic outlook, political forecasts, current events, political scenarios, personality profiles and a range of items updated daily and tailored to the specific needs of each client, according to Iris.

Direct Access

In addition, the company said, clients will be able to directly and securely access all Iris data bases and use company-developed software to construct their own political and economic scenarios, into which incoming data will automatically be fed and computed.

The basic fee for company services will be based on actual usage, but should run about $25,000 per year, minimum, according to Iris marketing executives.

A "modest market penetration" would include at least 15% of the 2,000 organizations the company has pinpointed as potential clients, according to Anthony C. Stout, an Iris founder. Iris will also seek government clients and is seeking ties with academic institutions.

What clients will get besides the services of experienced analysts under the direction of a former U.S. ambassador is access to the multimillion dollar computer facility nearing completion in a nearby Virginia location. The facility, including site preparation, hardware, software and salaries, will cost more than $6 million the first year, according to Lee T. Feldman, Iris director of systems and development.

Feldman will lead a data base maintenance staff of between 45 and 60 persons and a software staff of approximately 40. At one time a consultant to the Defense Department's Advanced Research Projects Agency in the development of automated intelligence processing technologies, Feldman said he brought together about 10 persons with like experience to develop the Iris software.

Third Mainframe?

The company is already considering purchase of a third Burroughs mainframe, according to Feldman, who noted the company's 6G bytes of Burroughs disk storage is only the start-up figure.

Much of the telecommunications portion of the system is still being designed, Feldman said. He described a worldwide distributed DP system using a mix of satellite relays, various packet-switched networks and on-site minis and terminals with color graphics capabilities. Iris has chosen Tektronix, Inc. 4025 and 4027 terminals for client sites, he said.

While reticent about discussing details of the Iris systems, Feldman claimed it is "far more advanced" than any other of its kind. Claiming "our algorithms are far more complex," he called the company's offerings "the first time a lot of these disparate technologies have been brought together."

Saying he and his staff were the designers of much of the U.S. government's security applications, Feldman said the Iris applications are more advanced than any of the other information tracking and analysis systems now in existence.

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Symposia Set on Stemming Losses Attributed to DP

WASHINGTON, D.C. — Inadequate controls over computer processing are causing business losses exceeding $3 billions dollars a year in the U.S. alone.

This figure was supplied by Herman McDaniel, a consultant with Management Resources International and the chairman for an international symposium that has been developed by his firm and BNA Education Systems to probe these problems and offer possible solutions. The symposium will be conducted in San Francisco on Jan. 7-8 and in Washington, D.C., Feb. 3-4.

Many computer experts believe that the actual losses are as much as 100 times the reported losses, McDaniel reported, based on the fact that many losses are never discovered and a large percentage of those that are uncovered are not reported.

He noted that several critical factors must be considered by businesses. The first is that most of these losses go undetected. Secondly, most organizations do not prosecute or even report them. The third point is that many auditors are not trained in the special investigative techniques required to detect such losses. The final issue McDaniel listed is that the individuals who are responsible for the losses know enough to be able to avoid detection.

During the last decade, much effort has been directed toward improving the physical security within which computer processing occurs, McDaniel continued. However, there has been little improvement in the reported losses from business and government systems.

Registration for the symposium is $300. Further information and registration details may be obtained from BNA Education Systems at Suite S-602, 1231 25th St. N.W., Washington, D.C. 20037.

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DP in 'Delicate Position'

Recession Strategy Drawn for DP Departments

By Lois Paul
CW Staff

Does the budget-cutting ax fall in all your company's departments except DP? And is that creating additional barriers between DP and end-user departments?

Despite the recessionary economy, DP departments' budgets are growing rapidly while other departments are being asked to slash their budgets anywhere from 10% to 15%, recent research by Nolan, Norton & Co., a DP management consulting firm, indicated. "While a recession may be tolerated in most departments, it can be traumatic for DP, setting it back three to five years if mismanaged," Richard L. Nolan said.

Because "this places data processing in a delicate situation," Nolan's firm has drawn up a four-point recession strategy. The first step involves developing a DP budget strategy that includes an identification of discretionary spending, a study of the user impact of spending scenarios and protection of the existing applications portfolio organization.

Point two is an organizational strategy that involves decentralization of the DP function that balances control with user effectiveness and a focus on efficiency. Personnel strategy, the third step, includes retaining key personnel and consolidating to strengthen staff. The final step is communication of the recession strategy to senior management, user management and DP staff.

Others See 'Tight Year'

Do other consultants and industry watchers agree with Nolan's viewpoints regarding DP during the recession? One industry watcher, Bob Jirout, vice-president for information systems and telecommunications for the Chicago Board of Trade, thinks 1982 is going to be a very tight year for DP departments. It looks as though the borderline projects are getting killed and the hiring plans have been cut back somewhat, Jirout said.

"Here, because we are building a new trading floor and putting in a lot of new equipment, our budget is increasing. But I know that if we did not have that building sitting out there that I would either have had to hold the line or just cut back," he added.

He noted that projects that are judged marginal and research efforts are usually the first to go, and training efforts are being cut back by DP departments.

DP departments are not facing the same cuts as other departments, Jirout explained. "If the DP department is doing their job, they can go before their executive committee and justify the projects based on cost savings." However, if they instead try to justify projects based on intangibles such as increased service levels or better response time, they will have problems, he said.

The potential friction between DP departments with relatively stable or increasing budgets and other departments that are facing substantial cutbacks is nothing new or unexpected, according to Jirout. "Friction has existed for years and I think people are beginning to understand it. For years our budgets have gone at a rate faster than other departments and there are reasons for that . . . But if we go in there with a song and a dance that we are kind of better because we are providing technology services, yes, there will be some friction."

Tim Corey, president of Corey and Associates, Inc., a computer/marketing consulting firm, concurred with Jirout that potential friction between DP and end-user departments will be minimal, if it occurs at all. "I think the end users, in many cases, will not only not be dissatisfied in the future, but will be happy to see more money going into the DP budget because it

(Continued on Page 15)

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Mass. Clerical Union Submits CRT Health Bill

By Tim Scannell
CW Staff

BOSTON — A clerical workers union here submitted a bill to the Massachusetts State Legislature last week aimed at protecting users from possible health hazards associated with CRTs.

However, it could be years before the bill — which is believed to be the second of its kind in the nation and the first backed by a union — is finally passed and becomes law, according to Joseph C. Faherty, president of the Boston Edison Clerical Workers Union and chief proponent of the bill.

The five-page bill basically requires that employers give advance notice to employees who might use CRTs, pay for extensive pre-use eye examinations and evaluations and install lighting and desk equipment designed to limit alleged CRT health hazards, Faherty said. The bill would also require structured "work breaks" designed to alleviate employee stress and periodic checks of office air quality and temperature.

Employee Eye Exams

A major portion of the bill centers on employee eye examinations that would not only consist of minimum optometric testing, according to standards set by the American Optometric Association, but would also include tests for visual acuity, eye coordination and muscle control and detailed examinations of the internal and external eye, Faherty noted.

The union's bill is based on the findings of a number of investigations conducted in the U.S. and Europe that focused on the possible health hazards of CRTs.

One of the tests included was a comprehensive investigation completed earlier this year by the National Institute for Occupational Safety and Health that turned up a large number of health complaints from CRT users in the San Francisco Bay area [CW, Feb. 16].

Another was an ergonomics survey conducted by Boston Edison's union with company employees who worked with CRTs. This survey found a number of these employees complaining of an assortment of medical problems ranging from headaches and dizziness to irritated eyes.

"My big thing is that when a person goes to work in the morning, he should be able to leave that office in the same way ... and not find out that the migraine headaches he's been having are because of poorly designed offices," Faherty said, defending the bill. "You can almost say it's us against the computer world."

Although the Massachusetts bill is reportedly the most extensive ever put before a state legislature, it is similar in structure to a CRT bill put before Maine's state government earlier this year [CW, May 4]. The Maine bill, sponsored by State Rep. Edith Beaulieu [D-Portland], was subsequently defeated.

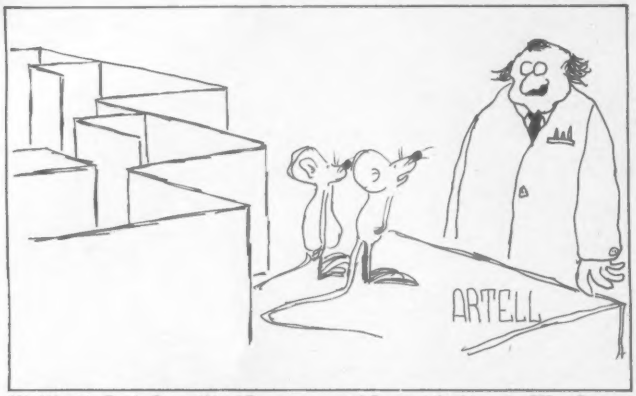
Unlike the Maine bill, Massachusett's legislation is backed by a union, which is a local of the Utility Workers Union of America-AFL-CIO. It also has the backing of the Massachusetts Committee on Safety and Health and a number of state-licensed doctors, Faherty said.

Steps Will Take Time

While the bill is the first step in enacting laws to protect users from the possible dangers of CRT use, it could be quite some time before any official steps are taken, the union's president and bargaining committee chairman pointed out.

"You might have a bill filed, but then it might not get out of a legislative committee for three years," Faherty said. "The committee chairman could sit on it and do nothing or have a full-fledged hearing on it where it comes out to the floor for a floor fight."

On the other hand, "if they do nothing on it, it just dies," he observed.



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Need Stressed for Integrated Network Standards

By Phil Hirsch
CW Washington Bureau

NEW ORLEANS — A big pot of gold awaits both communications carriers and users around the world when they switch to integrated digital networks — but unless all of those involved agree on and implement the related standards, these benefits will be lost, according to Clause Fuchs, deputy director of customer systems engineering at ITT World Communication, Inc.

Fuchs was among the participants in a panel discussion on "Integrated Services Digital Networks" at the National Telecommunications Conference (NTC '81) convened here last week by the Institute of Electrical and Electronics Engineers (IEEE).

If different countries implement their networks in different ways, Fuchs pointed out, the resulting incompatibilities "will offset the technical efficiencies gained." He added that reaping the benefits of digitization will require nations "to agree universally on more minute and intricate technical details than they have ever had to agree on in the past."

The incompatibility problem is reduced somewhat by worldwide agreement on the use of binary digits as the basic means of representing data, voice and image information, he said. However, "the overpowering advantages of a worldwide integrated communications system with the implied promise of economic benefit through pure technical efficiency will be truly realized only if we can agree on a common language international in terms of digitization techniques."

The difficulties in achieving such an agreement are suggested by comparing the standardization of analog and digital voice signals, Fuchs explained. Analog voice, because it is "a direct consequence of predictable parameters of the human body," has universal attributes (a frequency range of 0Hz to 300Hz, for example) that make standardization easier, he pointed out. But digitized voice is less dependent on such universal attributes and the task of establishing a digital voice standard is therefore far more subject to differing technological criteria.

CW At NTC '81

Methods to Digitizing Voice

"There are numerous methods [of digitizing voice], with many tradeoffs economically as well as technically," Fuchs explained. "High bit rates give good quality and voice recognition, but are more wasteful of the transmission medium. While low- to medium-rate vocoder techniques are very efficient during transmission, at best they have [relatively poor] quality in speech and lack voice recognition.

"In the international environment, these conditions are aggravated, since at least one and sometimes both participants in a conversation will speak the agreed-upon language with a severe accent. Obviously, techniques must be agreed upon and standards must be set if the benefits of digitization of an international scale are to be obtained. This is true not only for digitized voice, but also for data, video and facsimile."

A related problem, he added, is that the agreements must be formulated so that "each country's network and terminal equipment conform to the agreed-upon international standards." Achieving that goal requires decisions involving "technology, economics, nationality, politics, national security and national resources," Fuchs said .

Although he failed to cite specific examples, it is likely Fuchs was referring to such problems as the unwillingness of individual countries and their leading suppliers of systems and services to accept, in the interests of achieving compatibility, technology developed elsewhere — particularly if the country or supplier has already invested in a competing technology.

Despite these obstacles, Fuchs said, he is optimistic. One reason: The Consultative Committee on International Telephone and Telegraph, the organization that "recommends" standards subsequently implemented by most of the world's telecommunications administrations, is making "good progress" in developing recommendations for network, protocol and equipment standards. "We have the tools, the state of the technology, the determination and, hopefully, the wisdom to apply digitization intelligently to reach the goal of an international integrated digital network," he added.

Firm Offers Recession Strategy

(Continued from Page 13)

is going to directly benefit them."

Corey added that potential problems can be short-circuited before they occur through the efforts of enlightened upper management who can educate both DP and end-user departments to the potential benefits of not cutting DP for the entire organization.

Bill Ek, a management consultant with Arthur Anderson & Co., commented that "noncritical" DP systems are receiving lower level attention in terms of budget dollars. Friction between DP and end-user departments happens all the time, Ek noted, and is part of the reason for the IBM information center concept, which sets up a liaison department between traditional DP and end users.

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AT&T Videotex Experiment Calls for Cable TV Partner

By Phil Hirsch
CW Washington Bureau

NEW ORLEANS — AT&T wants to conduct another videotex trial — this time with a cable TV company.

Negotiations are currently under way with "a number of" prospective partners, AT&T Assistant Vice-President Dennis Sullivan Jr. said at the 1981 National Telecommunications Conference (NTC '81) held here last week. The basic goal of the test will be to experiment with a hybrid transmission scheme utilizing cable TV and telephone lines.

Under the scheme, the user would request videotex pages via telephone and the pages would be delivered via broadband cable TV channel, Sullivan explained. Faster service would be one benefit of this arrangement, he maintained, since the cable could transmit each videotex frame much faster than a telephone line. In addition, hybrid transmission would permit one-way cable TV systems to offer videotex service.

Discussing the implementation schedule for AT&T's Presentation Level Protocol (PLP), announced last May, Sullivan said Bell is currently designing terminals to implement the entire protocol. These terminals are scheduled for release in 1983, he said, noting that the peripheral introduction will take place in Miami, where AT&T, together with Knight-Ridder newspapers, is planning a large-scale videotex trial.

Packetization of videotex information is not a prerequisite for the acceptance of that data by the telephone network, Sullivan added. But conversion to a packet format would "facilitate data base access," he said. The AT&T executive also discussed the results of two recent videotex tests sponsored by AT&T — one in Albany, N.Y., and the other in Coral Gables, Fla. The first test took place in Albany. It involved an on-line data base containing listings from the Manhattan telephone directory as well as from directories for Albany and the surrounding area. Seventy-five homes and eight business establishments were involved in the test.

CW At NTC '81

The "bowsprit" trial in Coral Gables, Fla. — a collaboration with a subsidiary of Knight-Ridder newspapers — also included a wide range of videotex services, according to Sullivan. Information was accessed through a terminal designed by Bell Laboratories and assembled by Western Electric. Some 125 homes were involved in this test, he said.

"The overall results of the experiments were very positive in terms of the reactions of participants to the [basic videotex] concept," Sullivan reported. However, the services "were provided free of charge, thereby leaving the question unanswered as to whether consumers would be willing to pay for [videotex]."

The upcoming trial in Miami is designed to answer that question. That test will include up to 5,000 participants and will run at least one year.

AT&T still has a number of unanswered questions about videotex, according to Sullivan. "The large number of uncertainties that cloud the . . . market make it very challenging to plan future activities, particularly when standards are involved."

The firm's PLP is meant to reduce this uncertainty, he added, pointing out that "a single standard will reduce the consumer confusion that might otherwise result from a multiplicity of standards, stimulate the development of data bases and allow the marketplace to develop with all terminals being able to access all data bases."

Electronic Mail Feud Continues: USPS vs. Postal Rate Commission

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The feuding between the U.S. Postal Service (USPS) and the Postal Rate Commission over electronic mail continued unabated last week as the chairman of the USPS board of governors charged the rate commission with illegally interfering in postal management.

Board Chairman Robert L. Hardesty told a House of Representatives subcommittee last Tuesday that the Postal Rate Commission recommendations on the Electronic Computer-Originated Mail (Ecom) service are symptomatic of a commission trend to overstep its statutory authority to recommend postal rates and classifications.

"In the past two or three years, in particular," Hardesty said, "the commission has fashioned its recommended decisions in ways that interfere with the board's ability to direct the management of the Postal Service." He termed this conduct "wrong as a matter of policy and unauthorized as a matter of law."

The Postal Service will inaugurate Ecom early next month. The Postal Rate Commission originally recommended the service be tried first on an experimental basis. A federal court ruled the recommendation exceeded the Postal Rate Commission authority and the commission is now reconsidering the entire Ecom proposal.

Despite the board of governors' displeasure with several recent Postal Rate Commission actions, Hardesty said he does not support proposals to abolish the rate commission. Postmaster General William Bolger has recommended doing away with the commission, a plan that has won the endorsement of several members of Congress, but Hardesty said the commission's mandate to hold public hearings before recommending postal rates constitutes "a necessary function."

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France Seen Heading for Videotex Future

By Phil Hirsch
CW Washington Bureau

NEW ORLEANS — "Innovative Telecommunications — Key to the Future" was the theme of the National Telecommunications Conference (NTC '81) held here last week. Perhaps significantly, the first speaker was not an American.

Maurice Bernard, director of Centre National d'Etudes des Telecommunications, the chief research facility of the French telecommunications administration, opened the conference with an overview of Telematique — the multibillion-franc program backed by the French government and designed to convert the nation into an on-line information society by the early 1990s.

Between 1975 and 1980, Bernard said, the number of main telephone lines in France increased from 7 million to 16 million. This year, the French postal, telegraph and telephone administration ordered its last crossbar telephone switch. Eighty-five percent of the exchanges ordered in 1981 will be digital and this figure will go to 92% in 1982, he added.

Digital Links

Digital transmission links between all major French cities should be in place next year, Bernard reported. By 1984, digital switching and transmission facilities will provide "an entirely digital path between any pair of time division exchanges," and it will be possible to transmit at 64K bit/sec over these lines.

"Complete digitization of the French network is planned for 1983," he noted.

Much of the new digital transmission capability will be provided by optical fiber. "Economic considerations would favor optical fiber even if the traffic remained 99% voice," Bernard explained. But the emergence of Telematique, by adding data and other types of traffic, makes optical fiber even more feasible, he said.

Aside from upgrading the physical plans comprising the French telephone network, Telematique involves field trials of videotex and several other applications of new on-line information technology. These are being watched closely in the U.S. because the French are aggressively promoting the related hardware/software in this country, he maintained.

An interview with Roy N. Bright, managing director of Intelematique, begins on Page 28.

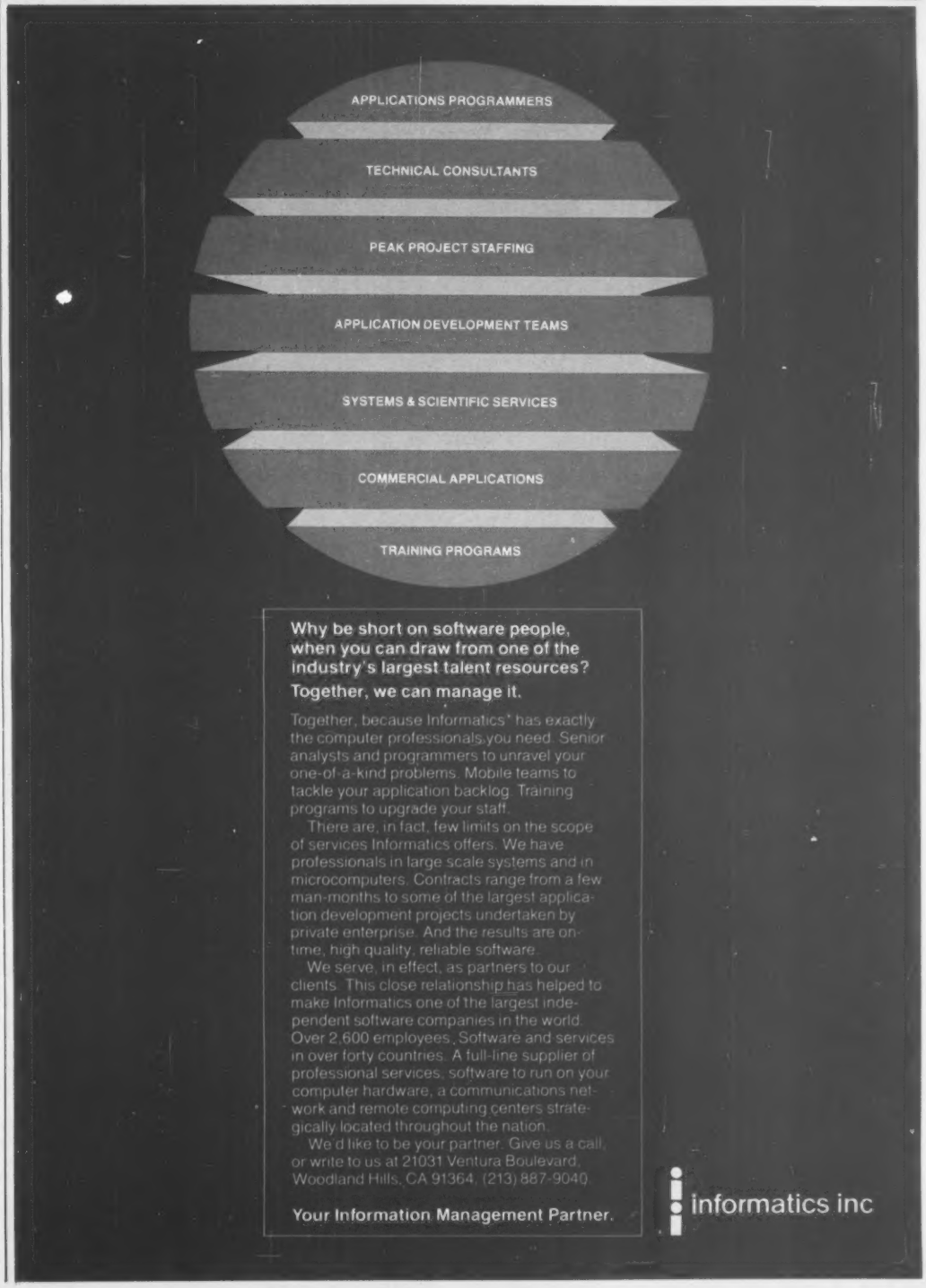
Among the trials now under way in France, Bernard said, are electronic telephone directory experiments in St. Malo and Rennes; a trial in Velizy (a Paris suburb) of a system called Teletel, which provides access to multiple data bases via home TV sets; a teleconferencing hookup connecting four cities; experiments involving a "smart" credit card with an embedded microprocessor in four other cities; and a test of a fiber-optic local-loop network in Biarritz.

In addition, the French plan to launch a domestic satellite in 1983. Among other applications, it will provide service directly to commercial and institutional users with large data traffic needs.

CW at NTC '81

Correction

The chart accompanying the story detailing IBM's recent additions to its 4300 computer line [CW, Nov. 23] contained several inaccuracies. IBM's 4321 processor was described as having two channels when in fact it has none. In addition, in the column listing the 4331-2's capabilities, the machine should be credited with a memory size up to 4M bytes and a cache memory size of 8K bytes.



TP Needs Most Demanding

Exec Lists Challenges Facing Bank DP

By Bob Johnson
CW New York Bureau

NEW YORK — On-line telecommunications, distributed data processing and information collection and dispersal are the three major challenges facing DP departments in the banking industry, according to Henry Carney, vice-president of operations at the U.S. Trust Co. of New York.

Reportedly one of the country's largest personal banks, the institution's computer division is manned by more than 125 employees. They contribute to a DP operation that processes and mails more than 1.5 million checks for its clients on a monthly basis, Carney said.

U.S. Trust is in a rather unique position, he explained in a recent interview here, since it is not a true commercial bank. Yet, all of the DP applications are run as if the firm were a commercial institution, he noted.

"The teleprocessing (TP) requirements of banking data centers are the most demanding," the vice-president continued. U.S. Trust will probably never have the extensive TP needs of larger commercial banks since the firm does not utilize "real branch banking," and TP in branch banking is really "what's happening," according to Carney.

U.S. Trust is no stranger to on-line processing, however. Historically an IBM user, the bank's system supports both CICS and IMS software under Vtam. In addition, the technical staff has developed an in-house, on-line Corporate Trust and Agency System (Ctas) and runs several other applications systems under CICS, Carney said.

Ctas, he noted, is an accounting system for stocks, bonds and municipal funds activities, which is responsible for generating the 1.5 million checks for U.S. Trust customers.

In charge of the firm's data center since 1972, Carney has worked with multiple hardware systems during his tenure. "When I came on board, we had IBM 360 Models 40 and -50 CPUs and [U.S. Trust has] evolved right through the IBM 370/145, 370/158 and 370/165 models," he said. The installation currently includes two IBM Model 3033 N mainframes, he added, pointing out that his preference for IBM equipment is based primarily on the service that the vendor provides.

Crediting data center personnel with much of the success of the company's computer operation, Mike Casale, operations manager, maintained that about a third of the technicians had been with U.S. Trust for at least 10 years.

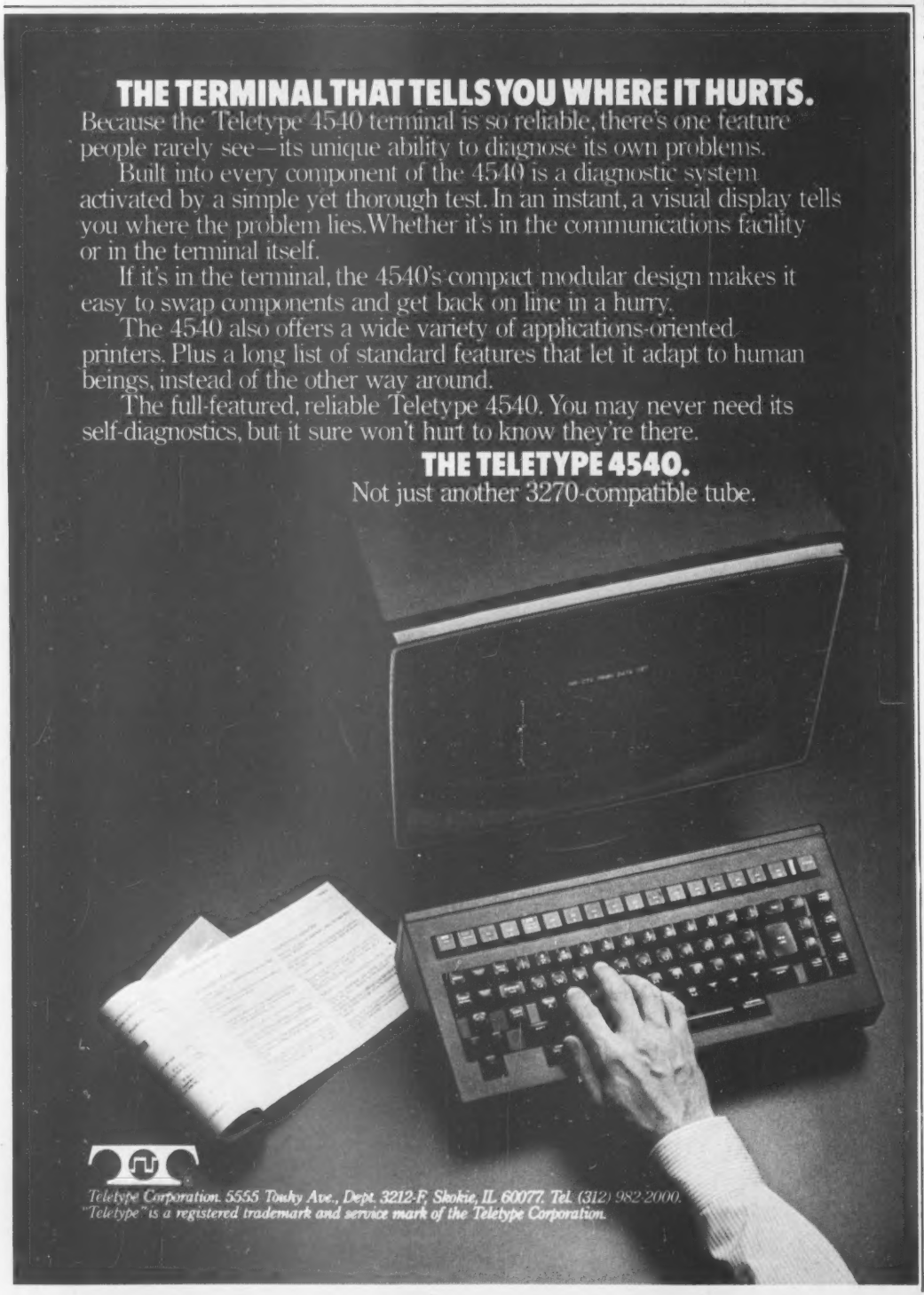
A feeling of loyalty and camaraderie during a time of economic uncertainty and personnel cutbacks keeps this computer shop stable, Casale stated. He stressed that managers should foster this type of atmosphere. "Our people know that if they do a good job there are rewards to be reaped," he said.

Working Relationships

Carney agreed that the shop works well because of good internal working relationships. The operation runs smoothly because of key individuals who came up through the ranks and instilled a sense of pride within the computer area, he said. "We try to establish an informal practice of what standard operating procedures should be," Carney noted.

As far as specific DP management policies are concerned, Carney felt that good management concepts are not generic to any one field. The entire DP world is looking for managers today rather than technicians with management potential, he said. "If the manager happens to be a technician as well, all the better, but DP is part of the corporate structure and the same management principles apply," he

(Continued on Page 20)



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Managers on the Move

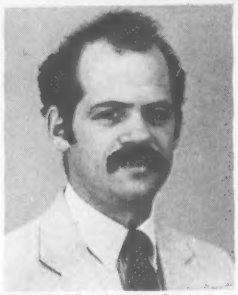
MICHAEL N. HOFMAN has been named director of information systems at Mercy Medical Center in Denver.

Hofman formerly worked as a consultant for Professional Systems and Training, Inc. and as a programmer/analyst at Community Electrocardiographic Interpretative Service Co., both in Denver.

Prior to that, Hofman was vice-president of operations at Northern Consolidated Industries, Inc. in Hanover, N.H.

Hofman holds an M.S. degree in health administration from the University of Colorado and a B.A. degree from Dartmouth.

He is a member of the Hospital Financial Management Association and also the Hospital Management Systems Society.



Michael N. Hofman

Richard M. Mooney

•••

RICHARD M. MOONEY has been named vice-president of management information services at Gates Learjet Corp. in Tucson, Ariz. In his new position, Mooney will be responsible for the manufacturing and business information necessities of the company's Aircraft Division.

Mooney was previously manager of corporate development services at Recognition Equipment, Inc. in Dallas, and he also worked for General Electric Co. in numerous managerial positions in areas of material, quality assurance, production control, machining and fabrication.

Mooney earned a B.S. degree in electrical engineering from Manhattan College, an M.B.A. from Southern Methodist University and a Ph.D. in management science from the University of Texas.

•••

ROBERT L. TRENCHARD has been appointed vice-president of management information services at Columbia Pictures Industries, Inc. in New York.

His new duties will include the supervision of all of Columbia's computer, billing, collection and disbursement operations. He will also be responsible for the company's ongoing efforts to computerize its other business operations.

Prior to joining Columbia, Trenchard was director of finance and data processing at the law firm of Paul, Weiss, Rifkind, Wharton & Garrison. Before that, he worked for Transamerica Interway as vice-president in charge of management information services, personnel and administrative services.

Trenchard graduated from Columbia University in 1967 with a B.A. in philosophy.

Challenges Outlined

(Continued from Page 18)

said.

Another vital part of the U.S. Trust computer operation is tied to the relationship with the end user, according to Carney. We try to maintain an "open and aboveboard relationship with users," Carney maintained.

"How can a DP shop work with users unless there is an openness between the two [areas]?"

Open communication is essential, he stressed. "Productivity will be lost if this kind of relationship is not there. [In order] to get something done you have to get to the root cause of the problem and this is the only way to do it," he said.

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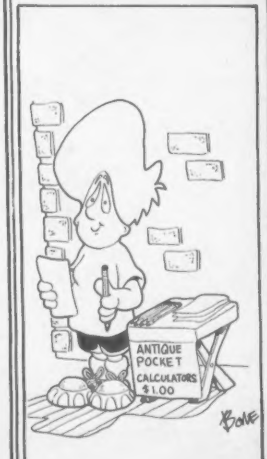

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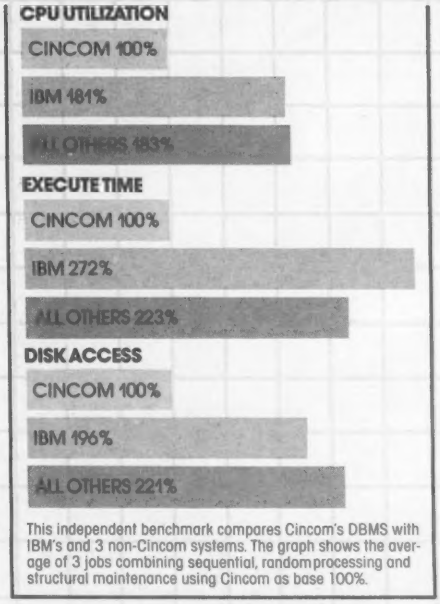

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Consultant: Most DBMS Today Still Use Batch-, CPU-Oriented Software

WESTBORO, Mass. — Despite the fact that most data base management systems (DBMS) can run both on-line and batch programs, the majority of installations today are still using data base software oriented for the batch/mainframe environment.

According to Roy Schulte, a marketing consultant for Data General Corp. here, the on-line data base software now coming into use for the 1980s is far different from the older DBMS designs. It is transaction-oriented and optimized to support interactive processing at the user interface, the critical point of difference between modern and older designs.

Its internal architecture is also optimized for performance in random-access, on-line applications, he said, and it features concurrency and recovery mechanisms, user-flexible privacy controls and screen-oriented utilities for interactive data base definition that are unavailable from its batch-oriented predecessors.

Many of the earliest batch data base capabilities served one user at a time with single-thread operation, Schulte continued. In most cases, these early DBMS were implemented as a set of subroutines callable from the applications program and linked into it so that they resided in the same memory partition at runtime. "The small-scale DBMS that run on microcomputers today generally are similar single-user systems that avoid the problems associated with serving multiple users," he said.

'List Processors'

Early DBMS implementations were often called "list processors," the consultant explained, because they were typically implemented with link lists. In contrast, modern on-line data base installations must deal with multiple users that are randomly contending for system resources. The software must manage internal data organization, as well as provide mechanisms to handle the special needs of on-line applications. More importantly, it must preserve data integrity through effective random-access safeguards, he noted .

"Much of the complexity in a full-blown DBMS is, in fact, tied up in the issue of concurrency controls and crash recovery algorithms," according to Schulte.

On-line DBMS group multiple data accesses into a logical transaction unit that enables contending users to get better access privileges. These systems also provide security for user transactions to the transaction unit level, he said. For concurrency control, the software has record-occurrence lockout capability, whereas batch-oriented data base systems often granted exclusivity only at the file level.

A crash recovery mechanism of modern DBMS makes use of logical-transaction grouping, according to Schulte. To guard against possible corruption of the data, on-line data base software automatically logs a "before-image" at the start of that transaction on the disk. If only part of the system crashes, incomplete transactions are rolled back and their results are voided.

Another protective device guards against a disk head crash or a serious logic error in the user applications program. As each user transaction is completed, the "after image" copy of all updates in that transaction is logged on tape to provide backup in case of a subsequent crash, Schulte explained.

Under older DBMS, before normal processing can resume after any type of crash, utility software has to examine the data base and manually restore it to a consistent state, Schulte said. "Recovery under these conditions can take hours to accomplish if it can be done at all."

Some Codasyl DBMS provide the user with a logical view of the data base called a subschema that presents the user with a view of all data and access privileges available to him, he said. Subschemata views may differ by showing only portions of the data base and by renaming, rearranging or restructuring its pieces. The second advantage of subschemata is that they carry access control information. For each subschema, security lockouts can occur at any level.

Non-Codasyl DBMS do not have subschema capability per se, but most of the newer software possesses an analogous mechanism, Schulte explained.

The final major difference between older and modern data base software is in data base definition and other off-line utility functions, he said. On-line software allows interactive data base creation and has strong, screen-oriented utilities for data base maintenance and for aiding operator productivity.

An on-line definition facility does away with the need for batch definition runs by allowing interactive input and error correction and by providing comprehensive tools for setting up and maintaining the data base, he continued. These include interactive parameter editing routines, screen scrolling, function-key commands and minimum uniqueness abbreviations.

Finerman Receives ACM Service Award

LOS ANGELES — Dr. Aaron Finerman received the Association for Computing Machinery's (ACM) Distinguished Service Award at the organization's annual conference here last month.

Finerman is director of the University of Michigan's Computing Center and professor of computer and communication sciences and of electrical and computer engineering.

The award is given annually to an individual each year "in recognition of long-term service not only to ACM, but to the computing community at large," ACM said. Finerman was cited for his extensive and productive participation in the management of professional society policies and operations.

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Florida Neurological Facility's System

FT. LAUDERDALE, Fla. — One-stop shopping has been extended to neurological health care at a facility here where a computer integrates business and medical functions for 5,000 patients.

The Center for Neurological Services (CNS) is one of a comparatively new breed of privately owned and operated clinics for complete diagnostic and therapeutic neurological services.

Opened in 1979, CNS so far has invested more than $1 million in sophisticated diagnostic and therapeutic equipment: a regional cerebral blood flow analyzer, CAT scanner, hyperbaric oxygen chambers, laboratory EMG and EEG equipment, X-ray equipment, a physical therapy and rehabilitation unit and a biofeedback and heavy treatment unit.

Tie That Binds

"When you attempt to bring together some of the country's top medical talent and some of the most costly diagnostic and therapeutic equipment available and then try to mold the two into a multidisciplinary approach, you need a way to tie it all together," CNS founder Dr. Joseph E. Gelety observed.

In this case, the tie that binds is a Wang Laboratories, Inc. 2200 MVP processor with 128K bytes of main memory, 80M-byte and 10M-byte disk storage units, four CRT workstations, two word processing daisy wheel printers and a 250 line/min band printer.

The center considered IBM and NCR Corp. hardware and other hardware-dependent software before deciding on the Wang system, according to Ginger Gelety R.N., CNS administrator and sister to Dr. Gelety.

"The Wang was rated the fastest mini . . . [and] the terminal is very user-friendly and easy to operate," she explained. "Most of the users here are medical people, not business-oriented people, and their computer experience is limited."

So with Wang's "speed and reputation" as selling points, Dr. Gelety and his two partners looked forward to a system for managing billing, accounting, payroll and insurance, as well as the patient history and diagnostic/treatment information essential to their practice.

By April 1980, CNS had hired an independent software vendor — Business Computer Solutions, Inc. of Hialeah, Fla. — to design and produce the software for the system. "At the top of Dr. Gelety's requirements was a system that would be fully integrated in a data processing and word processing sense," Dr. Ronald Goldstein, CNS president, recalled.

"He wanted to be able to enter data and text-based information into the computer and then use it repeatedly on both the business and professional sides of the practice," he added.

Electronic Journey

The system offers just that, and each patient begins his electronic journey at the time he calls for an appointment or walks in the door. Appointments are tracked by the computer and can be scheduled into the future indefinitely. Each appointment is assigned a priority code, based on information provided by the patient.

When appointments for a given day must be rescheduled for any reason, the priority codes are used to rearrange them, beginning with the most critical. The computer automatically prints out the patient names, phone numbers and new times for all rescheduled appointments.

When the patient arrives, he fills out a personal and medical history form. The data is keyed from the form directly into the computer and constitutes the primary data base on the patient, in-

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cluding personal data, payment and insurance information, the patient's dependent status and the name of the physician who referred him to the center.

Once the patient has been examined and/or treated and is ready to leave, the system automatically generates a letter to the referring party informing him of the patient's status and what further action is planned.

"With the system's word processing capability, we can select an appropriate prestored letter and tailor it with patient-specific data," Dr. Gelety said. "The computer then adds the referring agent's name and address from our master file."

Finally, if the patient is to be examined again at a future date, he can make another appointment before leaving the office or place his name in a "call notice" file maintained by the computer. The system continuously tracks recalls and generates notices in advance for mailing to patients.

Financial Records

Cash payments and account adjustments can be made and posted to the computer on the spot or the patient can be billed later, with all billing and invoicing done by the computer at the end of each business day.

The patient accounting system automatically prepares preformatted reports for all insurance carriers and standard forms for private third-party carriers. When multiple parties are to assume financial responsibility for costs, the system renders invoices to each party for the amount of his liability.

"We no longer have to set aside three or four days at the end of each month to catch up on our invoicing," Dr. Gelety noted. "The system automatically ages each account at 30, 60 and 90 days and issues appropriate dunning notices to each overdue account. Our cash flow has greatly improved and we always know the up-to-the-minute status of our receivables."

CNS staff members have assigned unique codes to the standard nomenclature of neurological diseases, as well as to each neurological, diagnostic and therapeutic procedure. The appropriate codes are entered for each patient during the course of treatment, and no patient ever leaves the computer's master file without a final diagnosis.

This policy ensures that the center maintains a complete medical data base on all patients — data that can be drawn upon in evaluating new cases.

From such data, CNS could, for example, "analyze the methods used in evaluating and treating all patients in certain stages of coma, all patients of a given age or those from a particular part of the country," Dr. Gelety said.

"In a similar fashion, we could also track each doctor and analyze the diagnoses and procedures he renders and employs," he added.

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The Managing Director of Intelmatique Talks

As managing director of Intelmatique — a company formed by the French postal, telegraph and telephone (PTT) administration — Roy D. Bright is responsible for promoting France's Telematique videotex program. Telematique consists of a videotex service trial called Teletel and a 10-year program to install electronic directory assistance terminals in every telephone user's home in France.

In July, about 2,500 households in the Paris suburbs of Velizy and Versailles and the region known as the Vale of Bivere became participants in the Teletel test service. Using government-supplied terminals to access via telephone a series of data bases, these participants can receive a variety of information such as news and railway schedules and perform transactions for banking and shopping.

About 170 companies and 40 government agencies supply the information and transaction services for the 20,000-page Teletel data base.

Two months before that, in May, about 1,500 households in the Paris suburb of Ile et Vilaine had become the first to receive the free electronic directory-assistance terminals. Using a small, government-supplied black-and-white video terminal with a typewriter keyboard, these participants gained access to all information in the regional yellow pages and white pages directories — a total of more than 250,000 entries, including advertising.

Bright, a London native, was head of the British Post Office's Prestel International Division before joining Intelmatique, the international marketing arm of the Telematique program.

Free-lance writer Elizabeth M. Ferrarini posed the following questions:

By Elizabeth M. Ferrarini
Special to CW

Do you foresee the socialist coalition government in France altering the direction of Intelmatique's plans for telecommunications in France and worldwide?

The new government has made a very positive statement regarding its views on the development of the Telematique program both within France and outside. M. Mexandeau, the new minister of communications, has stressed the need for a "democratic debate" insofar as the implications of Telematique within France are concerned. But he is very strong on the importance of exporting this technology and know-how around the world.

What is the current number of directory-assistance operators? How

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About France's Plans . . .

will France contend with their displacement?

There are currently 6,000 directory-assistance operators in France. Telematique will not entirely discontinue directory assistance. Inevitably, there will be people — for example, the blind and visitors to France — who will be unable to use the electronic directory effectively. As the service is extended nationally, beginners will require operator assistance.

It will be at least 10 years before the whole of France is served by the electronic directory system. Typically, switchboard operators include a high proportion of young people, who have a high attrition rate due to marriage, starting families and so on. Thus, I foresee the eventual reduction of operators being accomplished by natural attrition.

How have French newspapers reacted to the Telematique projects?

I have observed in many countries that the newspaper industry views videotex with mixed feelings. In France, some newspapers have expressed concern, while others are participating in the Velizy trial. For example, a group of regional newspapers have set up an electronic publication, the *Journal Electronique Francais*, and are issuing news headlines, entertainment, games and such to the participants.

My philosophy has been to point out that this technology will not go away and that newspapers have traditionally handled information — its collection, treatment and dissemination. Newspapers are better placed than any other industry to exploit and develop this new opportunity.

Does France plan to implement or test videotex in any Third World countries, especially the Middle East?

The French plans for the Third World are really no different from our plans for any other part of the world. We are promoting Telematique in these countries, but this is tempered by their circumstances. For example, the limited penetration of telephone and television receivers is a fair indication of the likely prospects for a mass market in these countries.

On the other hand, a number of professional organizations are considering this technology for professional use, either in business or government agencies. It is possible in the coming months that one or more of these will be implemented as a commercial operation.

Do you see videotex developing in Europe, specifically in France?

It will clearly take some time before videotex penetration in Europe reaches a significant level. The evidence obtained in the UK suggests that it has first to become established by penetrating the business sector with attractive prices.

The France PTT [postal, telephone and telegraph administration], unlike Prestel or Bildschirmtext [the German videotex trial service], wishes only to be a communications carrier, not the operator of central data bases or, as in the case of the Deutsch Bundespost [a PTT], the operator of specific gateways through which all videotex-type traffic must pass. The French PTT will only concern itself at the concentrator level to provide communications facilities between Teletel terminals and data bases. The only videotex data base for which the PTT will be responsible is the electronic directory.

In my view, this transparent approach is more likely to create a rapid

(Continued on Page 30)

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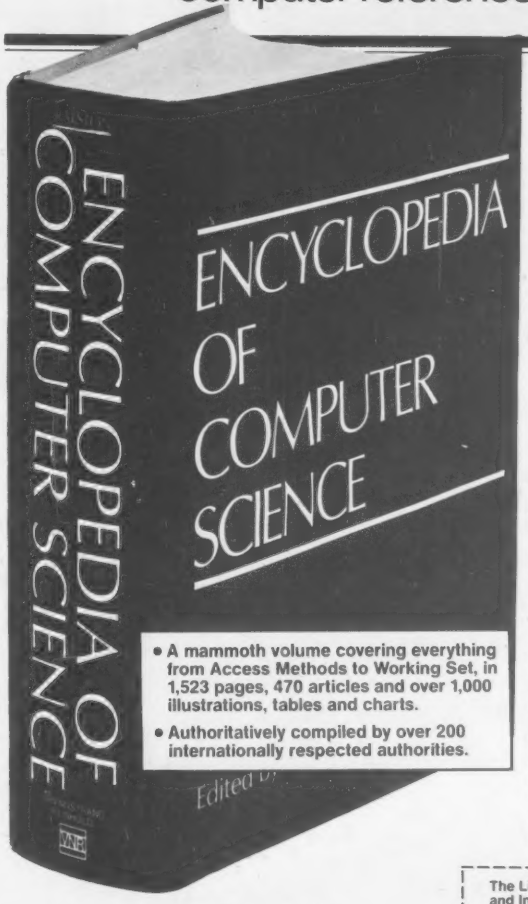

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. . . And Experiences as Videotex Trial Takes Flight

(Continued from Page 29)

development of videotex in France than [would] centrally managed solutions.

The flexible design of the Teletel service allows the development of independent videotex systems. Because the standards are common and the protocols have been identified and agreed upon, private videotex systems can exist either in isolation or, by dialing a different local number, can call up one of the Teletel data bases. There is no technical nor policy barrier to these arrangements.

In Ile et Vilaine, the electronic directory terminals are restricted to accessing directory data bases for market research and policy reasons. However, these terminals already have the technical capability to access any of the Teletel data bases. The classical problem of terminal costs preventing the growth of videotex in the mass market is bypassed, since the PTT plans to provide the electronic directory terminals free.

Is the "smart card" being tested in France or elsewhere?

I know of no full-scale smart card trials. At a trial in Velizy in the last quarter of this year, some 300 people will be provided with cards and small card readers that will interface with their videotex terminal. They can use the card for transactions with companies such as banks and mail-order houses. About mid-1982, three cities will each be equipped with some 200 point-of-sale terminals designed to accept smart cards. In each of these three cities, local banks will distribute 50,000 cards to their customers, who can use them at retail outlets, department stores, etc.

The financial institutions in Europe have created an international association to examine and prepare the way for use of the smart card.

Do you see any differences in the ways videotex will develop in the U.S. and in France?

The most significant difference is the initiative taken in Europe by government agencies, notably PTTs, in creating videotex systems. In the U.S., the initiative is being taken by a variety of companies ranging from publishing houses to financial institutions.

An important player in the U.S., which is not involved in Europe, is the cable television industry, although the bulk of its activity has been concerned with the broadcast or teletext technology. There is a growing interest in the possibility of linking this technology with videotex to create a two-way system. Also, in the U.S. the supplier of the information bears the bulk of the cost, whereas in Europe the user does.

Are French manufacturers planning to make compatible office automation/videotex equipment?

Ultimately, Telematique will enter the mass market. Implicit in this is the recognition that the small business user provides a valuable "stepping stone." Mass facsimile, developed as part of the Telematique program, offers a much lower cost to the small businessman, acts as a hard-copy output for the videotex terminal and offers a low-speed photocopying ability.

In addition, work is proceeding on a "low-cost, office-of-the-future" product that requires only the addition of local store and intelligence to the existing Telematique products. These developments confirm the trend toward office automation or "Bureautique" in France.

In France, what is the price of a color television set and a videotex decoder (without the set)?

A typical 19-inch television set would cost about $600 in France. An external adapter (including decoder, modem and full alphanumeric keyboard with infrared remote controls) would cost about $1,000. These prices are based on low-volume production. The Velizy trial requires only 2,000 terminals, and demand from the business sector is still fairly modest.

On the averge, how many hours do French consumers use the telephone and watch television?

Television broadcasting hours in France are more limited than in the U.S. — typically from lunchtime onward — and there are only three television channels in France. I would estimate that average viewing time in France is, at most, three hours a day, compared with about five hours in the U.S.

I have no information about telephone usage, but there are currently 16 million telephone users in France, both business and residential. The system is growing at the rate of 2 million connections per year.

THE LEADING EDGE

#1 in a series of reports on new technology from Xerox

About a year ago, Xerox introduced the Ethernet network—a pioneering new development that makes it possible to link different office machines into a single network that's reliable, flexible and easily expandable.

The following are some notes explaining the technological underpinnings of this development. They are contributed by Xerox research scientist David Boggs.

The Ethernet system was designed to meet several rather ambitious objectives.

First, it had to allow many users within a given organization to access the same data. Next, it had to allow the organization the economies that come from resource sharing; that is, if several people could share the same information processing equipment, it would cut down on the amount and expense of hardware needed. In addition, the resulting network had to be flexible; users had to be able to change components easily so the network could grow smoothly as new capability was needed. Finally, it had to have maximum reliability—a system based on the notion of shared information would look pretty silly if users couldn't get at the information because the network was broken.

Collision Detection

The Ethernet network uses a coaxial cable to connect various pieces of information equipment. Information travels over the cable in packets which are sent from one machine to another.

A key problem in any system of this type is how to control access to the cable: what are the rules determining when a piece of equipment can talk? Ethernet's method resembles the unwritten rules used by people at a party to decide who gets to tell the next story.

While someone is speaking, everyone else waits. When the current speaker stops, those who want to say something pause, and then launch into their speeches. If they *collide* with each other (hear someone else talking, too), they all stop and wait to start up again. Eventually one pauses the shortest time and starts talking so soon that everyone else hears him and waits.

When a piece of equipment wants to use the Ethernet cable, it listens first to hear if any other station is talking. When it hears silence on the cable, the station starts talking, but it also listens. If it hears other stations sending too, it stops, as do the other stations. Then it waits a

Includes Local Net

Printing Firm Composes Right Type of System

HOUSTON — Computa/cations, Inc. speeded up its printing composition process here while making it more convenient by installing a computer system that includes a local network.

The Datapoint Corp. computer system was integrated with traditional typesetting methods in order to produce corporate price catalogs, manuals and directories, Computa/cations President Jim Boyles explained.

Not only does the Attached Resource Computer (ARC) local network speed the composition process, it also makes massive price revisions automatic, Boyles said. And the same network and data used to make a catalog allow the firm to offer price and sales analyses and other traditional computer services, he noted.

System Assembly

It took about 10 months for Boyles to forge the computerized system. Beginning with one Datapoint 2200 processor, he has assembled a system that currently includes seven processors. The firm upgraded to the ARC network in 1977. The ARC can support up to 256 processors and can share the same disk files, printers and other peripherals, a company spokesman noted.

Typically, when a customer comes to Computa/cations, the staff will study the prospect's existing price book to decide on the best, most graphic way to present the information it contains. Ideas are sketched out and if the customer approves, the firm proceeds to implement those ideas on its computer.

Formatting the copy by computer is simply the start. After a book is completed, the price information is saved in the ARC network's disk files and can be used again later.

"The customer can call in and say 'Reprint the book and this time increase the prices by 10%,'" Boyles said. "On one 250-page price book, it used to take three people three weeks just to calculate the changes. After we took it over, the computer did it in 30 minutes and the whole job took three weeks, where it used to take two months and three weeks. We provide turnaround like they've never heard of before."

Files can also be used to extract data for abbreviated pocket-size handbooks designed for salesmen. By running sort programs, the company can avoid listing duplicate part numbers in customer catalogs.

Present System

Computa/cations' computer system now consists of two Datapoint 5500s, two Model 6600s and four 3800 CRT terminals, which have larger screens that are especially useful for word processing, Boyles said. One 3800 handles the firm's three 300 line/min printers. The system also has 80M bytes of disk storage. All the processors are connected by coaxial cable to the ARC network.

Two typesetting machines are hooked to the system. The computers "think" the typesetters are printers, while the typesetters "think" the computer is a paper tape reader, the company spokesman explained.

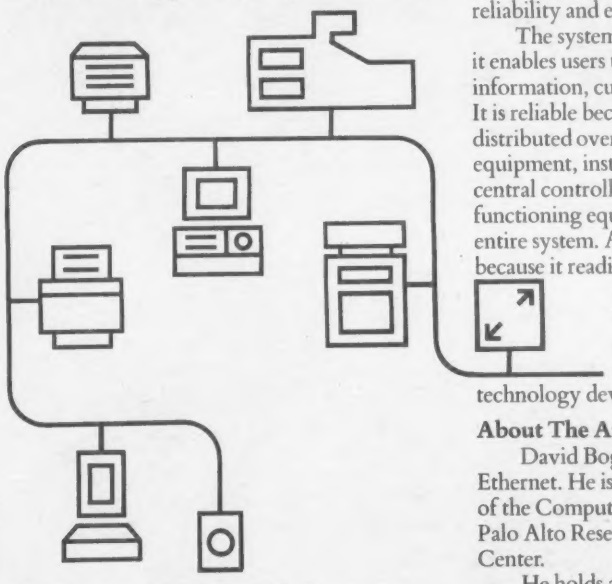
Computa/cations also has six Datapoint 8200 dumb CRT terminals, one of which is located at a country club several miles away. Accessing the ARC network through phone lines, the country club uses the terminal to run an inventory control program to keep track of its extensive wine list.

The wine list and the program are kept in the same disk files as the rest of the company's software. The country club can use it at any time without requiring any help from the Computa/cations staff.

"Business has been nearly doubling every year and I've been able to do it without doubling the staff," Boyles said. "The computer has revolutionized our business; we're 20% to 50% less expensive than what our customers are used to."

random amount of time, on the order of microseconds, and tries again. The more times a station collides, the longer, on the average, it waits before trying again.

In the technical literature, this technique is called carrier-sense multiple-access with collision detection. It is a modification of a method developed by researchers at the University of Hawaii and further refined by my colleague Dr. Robert Metcalfe. As long as the interval during which stations elbow each other for control of the cable is short relative to the interval during which the winner uses the cable, it is very efficient. Just as important, it requires no central



control—there is no distinguished station to break or become overloaded.

The System

With the foregoing problems solved, Ethernet was ready for introduction. It consists of a few relatively simple components:

Ether. This is the cable referred to earlier. Since it consists of just copper and plastic, its reliability is high and its cost is low.

Transceivers. These are small boxes that insert and extract bits of information as they pass by on the cable.

Controllers. These are large scale integrated circuit chips which enable all sorts of equipment, from communicating typewriters to mainframe computers, regardless of the manufacturer, to connect to the Ethernet.

The resulting system is not only fast (transmitting millions of bits of information per second), it's essentially modular in design. It's largely because of this modularity that Ethernet succeeds in meeting its objectives of economy, reliability and expandability.

The system is economical simply because it enables users to share both equipment and information, cutting down on hardware costs. It is reliable because control of the system is distributed over many pieces of communicating equipment, instead of being vested in a single central controller where a single piece of malfunctioning equipment can immobilize an entire system. And Ethernet is expandable because it readily accepts new pieces of information processing equipment. This enables an organization to plug in new machines gradually, as its needs dictate, or as technology develops new and better ones.

About The Author

David Boggs is one of the inventors of Ethernet. He is a member of the research staff of the Computer Science Laboratory at Xerox's Palo Alto Research Center.

He holds a Bachelor's degree in Electrical Engineering from Princeton University and a Master's degree from Stanford University, where he is currently pursuing a Ph.D.

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Larry Long's List Of Professional Societies

• FEDERATION OF NCR USER GROUPS

Purpose and Objectives: Prior to the formation of a governing body in 1970, the users of NCR Corp. computers had banded together in a number of distinct organizations. These user groups were established along geographic, vocational or product lines. Realizing the redundancy of administrative effort in so many separate groups and sensing a need for a more unified voice in dealing with NCR, what is now recognized as the Federation of NCR User Groups was created.

The continuing goal of the federation is the attainment of the purposes of the organization as set forth in the by laws. They include: to provide a means of centralizing the clerical and administrative effort of the member groups; to plan and produce an annual conference for all NCR users; to consolidate the voices of the member groups to produce a more effective dialogue between the manufacturer and the users.

For More Information: Rasma V. Thomas, Chairman, Communications Committee, Mammoth Mountain Ski Area, P.O. Box 24, Mammoth Lakes, Calif. 93546.

Larry Long is compiling a list of professional DP/Computer societies and organizations. To be included, societies and organizations should send a brief description of their purposes and objectives to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

• HONEYWELL LARGE SYSTEMS USERS ASSOCIATION, INC. (HLSUA)

Purpose and Objectives: HLSUA's purpose is to provide a forum for association members to exchange and disseminate information of mutual interest and value; to increase the effective use of the products and services related to the equipment needed to qualify for membership; to reduce redundant developmental effort for programs and systems of general use; and to provide a formal communications channel between the members and Honeywell Information Systems, Inc.

HLSUA is comprised of more than 400 corporations that own and operate large Honeywell systems. Biannual three-day conferences feature presentations covering techniques and concerns in hardware, software, communications and management areas of interest.

For More Information: Eunice O. Fichten, HLSUA corresponding secretary, Marine View Drive, Kent, Wash. 98031.

• SOFTWARE AG INTERNATIONAL USERS GROUP

Purpose and Objectives: The Software AG International Users Group is an independent organization. It is an active group that provides users of Software AG products with a forum for exchanging information and ideas about Software AG products and services.

A basic unit of the users group activities are regional meetings held regularly during the course of the year. Currently, there are 26 regional organizations throughout the world. Most of these groups meet at least quarterly.

The group also publishes a newsletter, sponsors special interest groups and holds an annual users conference.

For More Information: Alan Routhier, president of Software AG International Users' Group, County of Sacramento, Systems and Data Processing, Room 0740, 700 H St., Sacramento, Calif. 95814.

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Unjust Cost for Forecasting Model?

Turnaround Time
By Larry E. Long

Q Our Information Processing Division recently quoted what I believe to be an unreasonable cost for developing a forecasting model. As a knowledgeable user with some background in computers, I can only assume the figure has been substantially padded.

The money is simply not in our budget, but the model is central to our long-range plans. Since corporate policy prohibits the use of outside services, we're at a standstill.

A Let's give the information processing people the benefit of the doubt. If the model is that important to your function, it must be a justifiable expense, even at the quoted cost, and the money should be available from other sources.

Now, let's assume the estimate is wrong. Discuss their approach to cost estimation and request an itemized explanation. Attempt to arrive at a consensus understanding of the level of project risk.

There is justification for padding the estimates of a high-risk project, but a highly structured, well-defined project should reflect realistic estimates. If the project has limited risk, I think information processing will agree to lower the estimates.

Q More than half the programmers in our office are runners. We recently submitted a written request to install shower facilities in our office building. These facilities would enable us to use our lunch hour to run.

Do you have any productivity statistics to support our contention that people are more productive after exercise?

A Since I've publicly recommended mid-day exercise as a means of increasing productivity, I'm hearing of more and more requests for such facilities — and, unfortunately, an almost equal number of rejections.

Staid old traditions seem to be more important than increased productivity (and, therefore, increased profit) to some companies. While I found no formal study that renders a well-founded productivity statistic, I've talked to many management information systems (MIS) professionals and 100% tell me that their substantial increases in productivity (from 25% to 90%) can be attributed to their lunch-time exercise routines.

Q I read with interest the "simple" solution offered in a recent Turnaround Time column to the problem of programmer turnover. Obviously, the respondent is from a geographic area or an organization that offers a high degree of flexibility in personnel policy.

Unfortunately, a great many individuals involved in DP management are not provided this luxury. The real world includes unionized DP shops, which number in their ranks even supervisory personnel. Wages are determined by job classification and seniority; promotions are determined by the number of qualified applicants. Such luxuries as "comp" time are prohibited by law.

The "simple" solution of "caring" is far removed from today's DP shop and is reflective of a utopian environment, which relatively few can enjoy. Alas, whatever happened to simple solutions to complex, complicated problems?

A Your point is well taken, but many managers have more flexibility than they care to exercise. We can care, even in a union shop.

Q I am in my second semester of Cobol programming at a junior college. I have a degree in economics and 10 years' experience with MIS (much of it with manual systems) in state government. I am interested in moving into a programmer/analyst position.

Most ads for programmers require at least one year's experience in programming. Is this meant to be actual job experience or will two semesters of programming courses plus job experience in MIS satisfy a one-year experience requirement?

A A four-year degree, 10 years' experience in almost anything and a couple of Cobol courses are ample credentials for immediate entry into a programmer/analyst position. The demand is such that many companies are willing to absorb the cost of retraining.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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Computers Help New Hampshire Nab Fugitive

CONCORD, N.H. — After three years of fruitless searching for a fugitive from Massachusetts law enforcement authorities, the New Hampshire State Police recently helped locate the suspect — with the help of a year-old computer.

"All we knew was the suspect's name and that he was thought to be living in a certain area of New Hampshire," recalled Col. Harold E. Knowlton, director of the New Hampshire State Police.

"The computer gave us the names and addresses of all state residents with that surname plus those which are similar phonetically, since the name was not a common one.

"Although the suspect was using an alias date of birth, he had registered a vehicle in New Hampshire. That information was enough for the computer to confirm an address, which led to the suspect's arrest," Knowlton added. "Without this computer search, the fugitive could still be at large."

The computer system used for the search is a twin Honeywell, Inc. Level 6/33 that communicates with computers located at other state of New Hampshire departments, with other states' police computers and with national crime watch data centers.

The computer communications system is used to gather information on known and suspected criminals of all kinds, making it easier for law enforcement officials to apprehend not only fugitives but also car thieves, burglars and murderers.

"The use of computers not only makes this information available for the first time to thousands of state police and other law enforcement officials nationwide, but it also means that our officers are able to make faster, more informed decisions when faced with a possible criminal situation," Knowlton said.

"The whole process, from our inquiry through receipt of information, can take less than 20 seconds," according to TSgt. Fred Booth, in charge of DP for the state police. "Before we had the Level 6, we had to use a teletype terminal to query the [national] message switching system and the response time was several minutes."

Within New Hampshire, the Level 6 communicates with a Honeywell DPS 8/52 large-scale system at the state's central DP center, which includes records on all motor vehicles registered in the state along with accident reports and traffic violations by New Hampshire motorists.

In addition, the Level 6 shares data files with a Sperry Univac system at the state's highway department, which contains data on all New Hampshire drivers' licenses.

Various Links

The Level 6 also communicates with the IBM controller at the National Crime Information Center (NCIC) in Washington, D.C., a 24-hour data service containing information on all stolen motor vehicles, guns and other property as well as data on wanted and missing persons. NCIC covers the 50 states, Canada, the Virgin Islands and Puerto Rico.

Another communications line links the Level 6 to a Digital Equipment Corp. computer in Phoenix that controls the National Law Enforcement Telecommunications System (Nlets), a message switching center that services all state police computers except Hawaii.

Nlets differs from NCIC in that there are no resident files; it simply polls the various state police data centers and extracts whatever requested information is on file.

"For example," Booth explained, "when we recover an abandoned vehicle with no license plates, we use our Level 6 to send the vehicle serial number to the message switching network. The system polls all state police computers in the nation to see if one will have a match for the number."

The data received from the switching system includes the name of the vehicle's registered owner, his or her date of birth, legal and mailing addresses, the vehicle's license plate number and date of expiration, make, model, style, weight and number of cylinders.

"Regardless of which state police computer provided the vehicle data, the message is routed back to the Phoenix computer and is boosted by a switching station in New Jersey before it is received here at our New Hampshire headquarters," Booth said.

The Level 6 also maintains backup files of all New Hampshire NCIC data in case regular communications lines fail or are tied up with other traffic. In addition, the applications software written for New Hampshire's Level 6 systems by Computer Projects, Inc. of Greensboro, N.C., allows a single keystroke to query many computers in the state or national networks simultaneously.

Messages are sent from the Level 6 to 18 teletype machines at local police and sheriff stations throughout the state.

Installed in August 1980, the twin Level 6/33 system supports 21 on-site or remote communications lines and has a combined main memory of 256K bytes, 104M bytes of formatted disk storage, one 800/1,600-in./sec dual-density tape drive, six printers and 10 Honeywell VIP 7801 video terminals.

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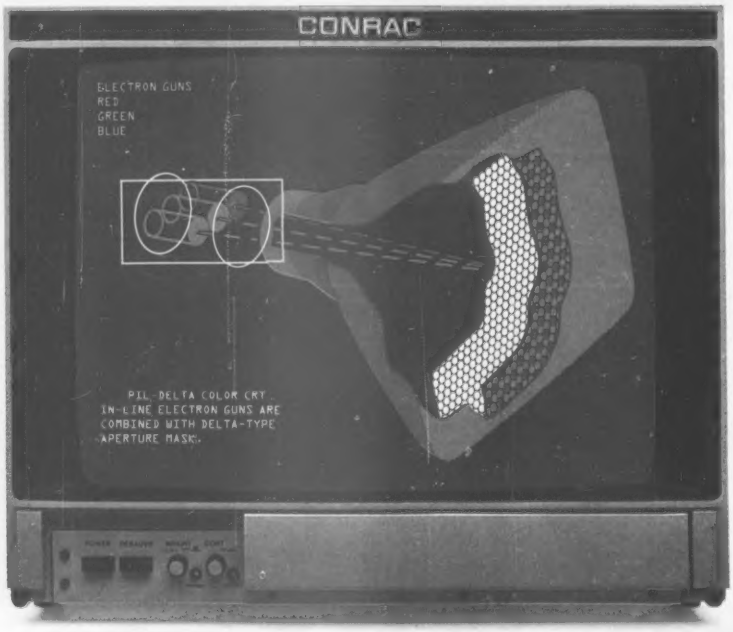

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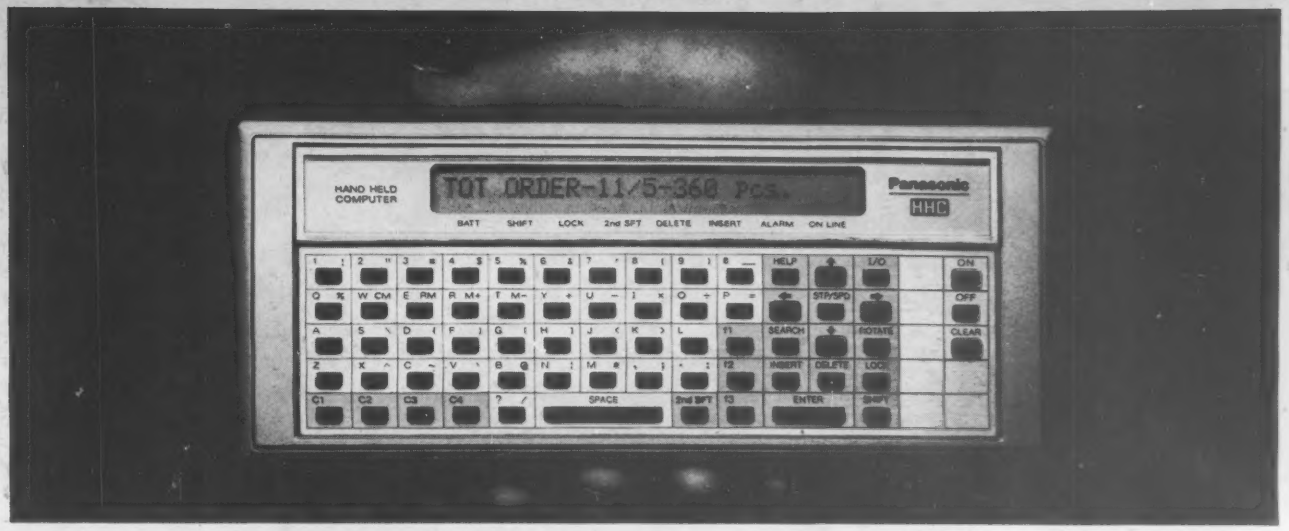

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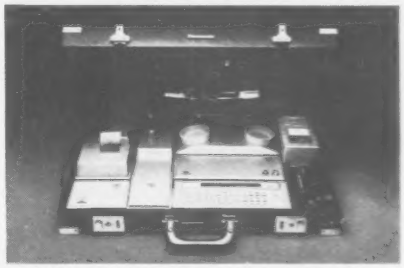

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Speeds Billing, Cash Flow

In-House System Aids Surgical Supply Firm

ALLENTOWN, Pa. — Heading into a growth period meant a new approach to handling billing, cash flow and equipment inventory for Surgical Supply Service of New Jersey, Inc. here.

In the past, an inordinate amount of paperwork was being generated for a wide variety of revenue sources, President Albert Deckter explained. However, only certain portions of Medicare invoicing had been automated by an outside service bureau, he said.

"The service bureau created monthly invoices for us to send to Medicare and made adjustments to our accounts receivable when we received a payment. It was better than nothing — but dealt with only a fraction of our paperwork. We still had to create invoices and receivables for Medicaid, private sales and rentals and all other third parties," Deckter said.

The firm's solution was to install an in-house computer that produces invoices and maintains accounts receivable by line item, letting Deckter know exactly where he stands financially and accounting for every one of the more than 300 different items stocked in the company's Allentown and Philadelphia offices.

The system also is providing select data to help Deckter build referral sources for future business, develop new marketing programs for certain doctors and specific categories of customers and monitor the volume of business by items on a continuing basis, he said. "What's really significant is that we're doing all this for $1,000 a month less than it cost to retain the service bureau."

Single System

Because the principals in Surgical Supply Service also own a podiatry supply house that was experiencing the same billing problems, Deckter's initial intent was to invest in a single system that would handle the needs of both businesses.

"My partner and I actively participated in demonstrations of at least 30 different computers and eventually narrowed the field down to three possibilities," Deckter said.

The eventual choice was Nixdorf Computer Corp. Deckter had some reservations because the company was smaller than some other firms and the Nixdorf name was new to him.

However, he eventually agreed to contract for Nixdorf's 8870 General Business System for the firm's Philadelphia office.

Initially the durable medical equipment (DME) rental and podiatry operations were both on the single system.

Six months later, however, after deciding that there were enough accounting differences between the two businesses to warrant separate systems, Deckter ordered a second 8870 for Allentown. The first system was devoted strictly to podiatry: the second, to DME.

Prototype Package

The software furnished for Allentown was a prototype DME package developed by Nixdorf to achieve the specific objectives established by Deckter.

To handle DME business generated in Philadelphia, a second terminal was installed to communicate with Allentown, where final processing is completed, according to Deckter.

In addition to producing the required invoices and maintaining accounts receivable, Deckter's new system provides data on how much money Medicare owes and how much Surgical Supply Service can expect to receive in terms of the 80% of the total bills that Medicare is authorized to pay, Deckter explained.

It also issues reports on how much money customers own in co-insurance and deductible, he said.

Deckter now can identify each rented piece of equipment by pay code; determine when Medicare pays either too little or too much for a piece of equipment; determine how many invoices have been issued for both sales and rentals of each inventory item in any given month, period or year; verify the quantities of every item in inventory at both offices at any time; print mailing labels; purge customers from the system automatically; and purge, during each month-end processing, all receivables which have zeroed themselves out.

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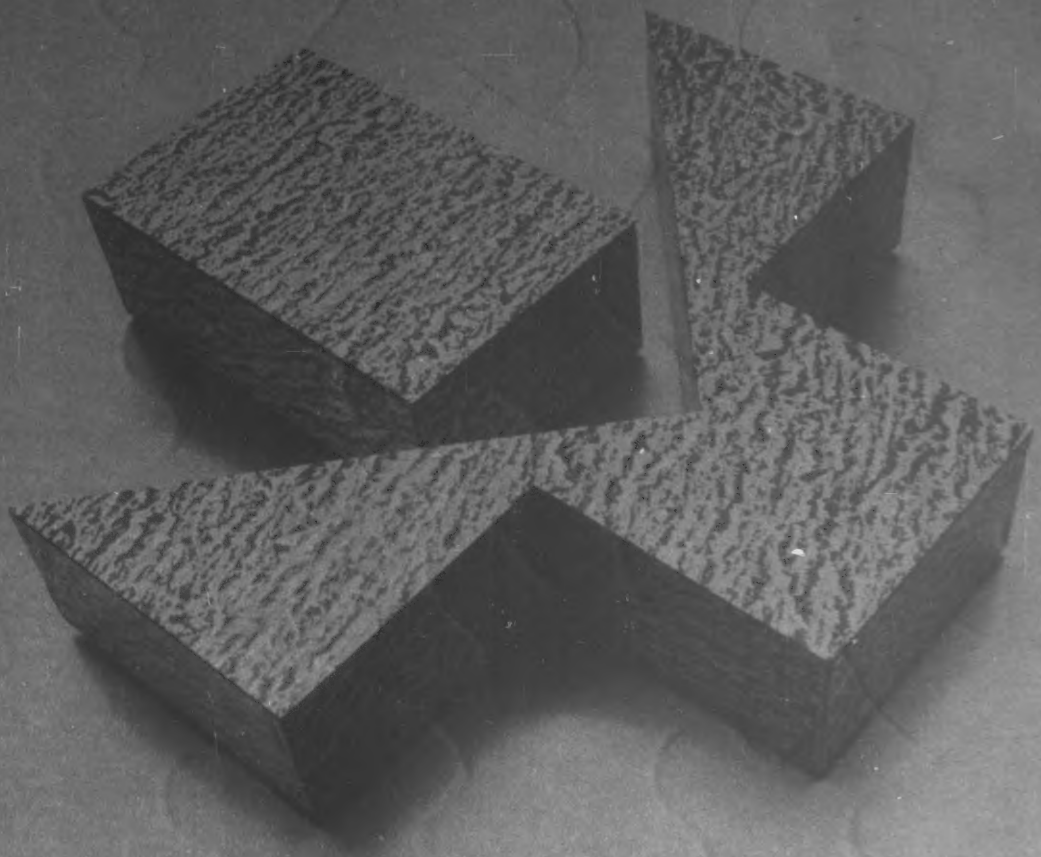

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Data Structure Features Give Clues to DBMS Choice

By C.W. Holsapple
Special to CW

How does an applications developer distinguish between the existing data base management systems (DBMS)? There are a number of methods available to determine which package will be the best choice for his particular installation.

Variation in logical data structuring features is a principal criterion for differentiating among DBMS approaches. In the relational approach, all relationships must be represented by the repetition of identical fields in record types that are related. In the hierarchical approach, utilized by Intel Corp.'s System 2000 and IBM's DL/1 physical data base, relationships can be represented by declaring a one-to-many relationship between two record types.

The shallow network approach typified by Cincom Systems, Inc.'s Total and Hewlett-Packard Co.'s Image DBMS represents relationships by declaring a one-to-many "master-detail" relationship between two record types. This approach allows a detail to have more than one master.

Codasyl Approach

With the Codasyl network approach offered by Cullinane Database Systems, Inc.'s Integrated Data Base Management System (IDMS), relationships are represented by declaring a named one-to-many "owner-member" relationship between two record types.

Like the hierarchical and shallow network approaches, the Codasyl network approach prohibits cyclic or recursive structures and provides no facility for directly representing the many-to-many relationships that so frequently arise in applications development.

The most recent major DBMS innovation is the extended network approach, which does not limit the applications developer to relational, hierarchical, shallow network or Codasyl network structures. It also supports the direct declaration of named many-to-many relationships called N:M sets. The extended network approach also supports recursive logical structures, direct declaration of one-to-one named relationships and other logical data structuring features.

With all DBMS approaches, data manipulation commands are stated in terms of a data base's logical structure. Nearly all DBMS provide interfaces between their data manipulation facilities and host programming languages, allowing straightforward integration of data handling with menu logic, computation and report formatting.

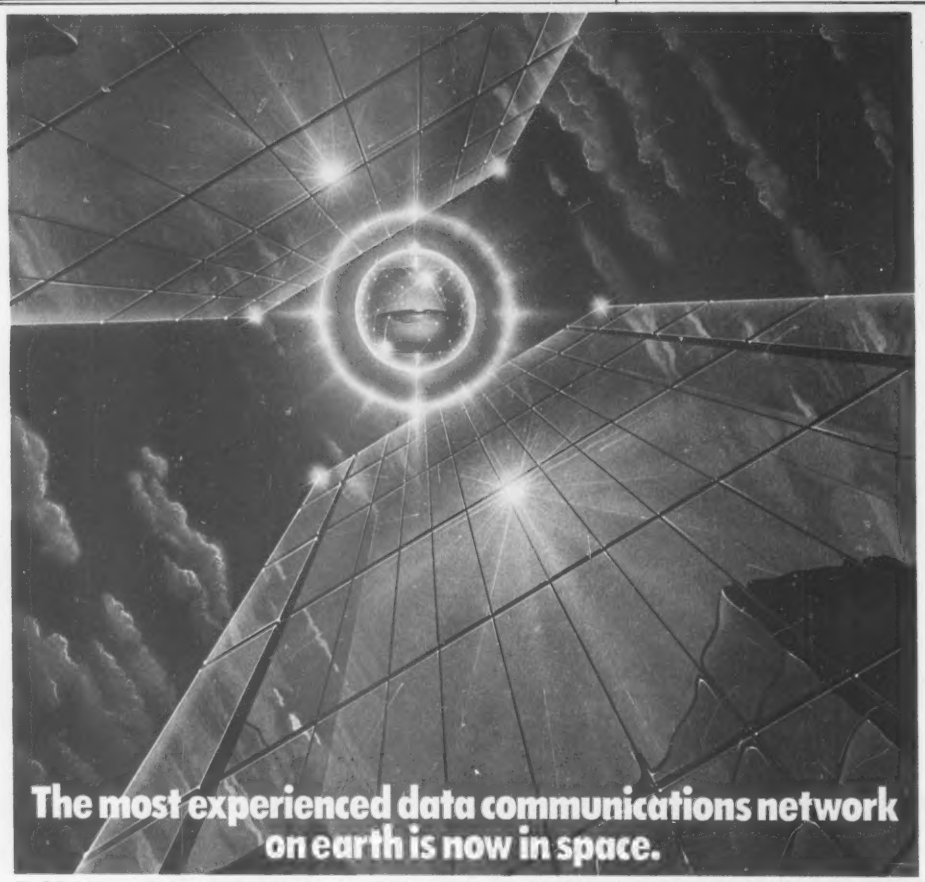
There are three major types of built-in data security that an applications developer should assess when evaluating DBMS. The first uses passwords, for example, to prevent unauthorized end users from utilizing the applications software.

The second and more selective type of security restricts each authorized end user to certain kinds of access for selected data items, record types and record type interrelationships.

A third type of security is used to guard the data base from unauthorized disclosure through a sequential scan of auxiliary memory that is instigated from the operating system. This allows the applications developer to declare, as a field is defined, that the field's values should be encrypted.

Data integrity is less of a problem with DBMS that do not depend on data redundancy than it is with systems that require data redundancy.

Holsapple is associate professor of business administration at the University of Illinois (Champaign) and is presently on leave as visiting associate professor of management and computer science at Purdue University.



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Volkswagon Dealer's System Tracks Bug Bugs

ORANGEBURG, N.Y. — What do a man with an ailing Volkswagen in New Jersey and a woman with a recalcitrant rebuilt automobile engine in Connecticut have in common with a computer in New York?

Without knowing it, both people and the IBM computer are part of a growing automotive communications system that automatically keeps track of their cars' general health and well-being. At the push of a few buttons, the system also provides a mechanical history for more than 125 mechanics in New York, Connecticut and New Jersey.

The IBM 370/158-3 computer, located at Volkswagen's worldwide headquarters here, is the center of the communications network that provides an up-to-the-minute record of service and repair work on Volkswagen, Porsche and Audi cars.

Tri-State Area

At the moment, the network includes 450 terminals at Volkswagen dealerships scattered throughout the tri-state area and handles an average of 120,000 transactions per day. During peak days, it is not unusual for the system to log 3.8 transactions per second, according to Rainer Josenhanss, executive vice-president of World-Wide Volkswagen.

The success of the network is evident by the rise in the number of sales in service repairs despite the current down cycle in the automobile industry as a whole. For example, sales in service repairs for the past six months are 12% to 14% higher than for a comparable period in 1980.

About one-third of a dealer's profits are derived from repair and service sales, Josenhanss explained.

Germ of Idea

The idea for the network grew out of a 1978 review of dealership profits and a concern that dealers' customers were turning to other sources for repair work after the warranties ran out. The auto firm had an existing computer system that handled dealer accounting and related functions via IBM 3278 terminals, but wanted to expand it to help boost parts and service sales and increase what Volkswagen calls 'Repeat Customer Loyalty', Josenhanss said.

"I wanted a system that would tell us if a customer hadn't come in for warranty work or routine maintenance because then we would be able to send out a mailing to bring him back to the shop."

A pilot program began in late 1979 with three participating dealers. The pilot proved so successful that more dealers came on-line in 1980, followed by others this year. Now the total number of dealerships logged into the system is 127.

Basically, the system keeps tabs on how frequently a customer brings in his car for repairs or routine service and exactly how much work was done on the vehicle. For instance, if a customer brings in an automobile that is not performing properly, by accessing the history file via the IBM 3278 terminal a mechanic can tell how long it has been since the car's last tune-up, if the car is still on warranty, or if the customer has been a little forgetful of routine engine check-ups.

With so many dealers relying on the system and accessing the information files, World-Wide is currently taking steps to ensure that as few problems as possible crop up on the computer equipment and on the communications lines that transmit data between locations. As part of this effort, Volkswagen is testing five IBM 3863 modems with enhanced diagnostic capabilities. If a dealer finds a problem with his computer terminal, the modem can determine if the difficulty is in the computer equipment at either end or in the line between, Owne P. Monaghan, the firm's director of systems and data processing, explained.

"The equipment provides for quicker entry of all accounting data, easier entry of warranty claims and easier recovery and correction of errors," Frank J. Schaffelkd, Volkswagen's vice-president of service, stated.

Call for Papers

WESCON/82, Anaheim, Calif., Sept. 14-16, 1982.

Ideas for sessions are now being solicited by the program committee. Proposals must be suitable for a two-hour session to be presented to conference attendees. Cohesive collections of papers, not to exceed five, are recommended by the committee. Possible subject areas include, but are not confined to, avionics and aerospace electronics; analog and digital signal processing; CAD/CAM and CAT; communications; hardware; software; graphics; consumer electronics; displays and display systems; geophysical electronics; human factors engineering; office automation; robotics and automation; semiconductor technology; and speech recognition and synthesis.

Session proposals are due Dec. 21, 1981. The target deadline for manuscripts is May 24, 1982. All correspondence should be directed to Wescon/82 Professional Program Committee, in care of Dale Litherland, Suite 410, 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

INTERNATIONAL PERIPHERAL EQUIPMENT & SOFTWARE EXPOSITION, Anaheim, Calif., Sept. 29-Oct. 1, 1982.

Papers are being sought on technology and new products and applications on the following or related topics: random-access storage; CRT terminals; printers; data communications; and software.

The deadline for 100-200 word abstracts is March 26, 1982. They should be addressed to William Ashman, Program Coordinator, Cahners Exposition Group, 222 W. Adams St., Chicago, Ill. 60606.

INTERFACE '82: SIXTH ANNUAL HUMANITIES AND TECHNOLOGY CONFERENCE, Marietta, Ga., Oct. 21-22, 1982.

This conference is cosponsored by the Department of English and History of the Southern Technical Institute and the Humanities and Technology Association.

Papers are being solicited on the integration of humanistic concerns and technological growth. Submissions should focus on any of the following areas: relationships between the humanities and technology in business and industry; ramifications of technology in ethics; history and philosophy of technology; public policy toward science and technology; curriculum design; role of technology in science fiction, American studies and popular culture; and responses of literature, aesthetics and the arts to technology.

One-page abstracts should include the author's name, affiliation and title. They are due May 1, 1982 and should be sent to to William Pfeiffer, Department of English and History, Southern Technical Institute, Marietta, Ga. 30060.

PAN AMERICAN PUBLIC WORKS EXPOSITION AND CONFERENCE '82, Bogota, Columbia, Nov. 9-12, 1982.

Technical papers on insights or advances in the field of computers being used in public works and services in Latin America are being sought for presentation.

Authors are invited to submit a 100-200 word abstract before March 1, 1982. Abstracts should include the author's name, title, company or agency, address, telephone and telex numbers. Authors are also advised to include the language in which the paper will be presented and a description of any audiovisual equipment that may be used. Correspondence should be sent to the program coordinator at Oakbrook Exposition Management Ltd., 1000 Jorie Blvd., Oakbrook, Ill. 60521.

Free Brochures

• *The World's Largest Selection of Computer Supplies* is a 64-page catalog released recently by Edward Ochman Systems.

The text includes information on computer tape and storage; disk packs and storage; disk cartridges and storage; control panels and wires and storage; computer binders and storage; computer ribbons; self-adhesive labels; microfiche supplies and storage; microfilm supplies and storage; insulated disk and computer tape files; punched card files; diskettes and storage; magnetic cards and storage; word processing cassettes and supplies; digital cassettes and storage; video cameras; personal computers; programmable calculators; CRT workstations; acoustical cabinets; and more.

The free catalog is available from Edward Ochman Systems at Box 141, Fairfield, Conn. 06430.

• *The PTC Voice Response Application Handbook*, compiled by Perception Technology Corp. (PTC), describes the various applications of modern voice response technology. The 32-page booklet includes illustrations, a glossary of terms and applications information on data processing, financial information reporting, banking, manufacturing, transportation, and a retail and wholesale distribution.

The handbook can be obtained from Linda Foss at PTC, 95 Cross St., Winchester, Mass. 01890.

• A directory of third-party software packages for IBM Series/1 minicomputer systems is available from Control Data Corp. More than 240 applications packages from approximately 150 third-party vendors are listed in the 41-page text.

Copies of the directory are available from L.E. Fonder at Control Data Corp., 2200 Berkshire Lane N., Plymouth, Minn. 55441.

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CGE Transforms Operation With Manufacturing Control

GUELPH, Ont. — A manufacturer of large power transformers for utilities here began a major modernization effort with the introduction of an on-line computer-assisted manufacturing control system.

One of the first lessons learned during the modernization process was that software requirements should dictate hardware selection, according to Jim C. Gray, material manager at Canadian General Electric (CGE).

The objective of Gray's group was to integrate all master scheduling, purchasing, inventory control, production control, traffic, customs, stores, receiving and operational planning within one system. After investigating many software packages, the company selected NCA Corp.'s MS-11 manufacturing system, which was designed to run on the Digital Equipment Corp. PDP-11 family of computers.

CGE chose MS-11 after being impressed with its proven customer base. "'Proven' to us meant that it had to be in use for at least a year," Gray said. "We were able to obtain a list of MS-11 installations and compare their results with our expectations."

Three Categories

The company expected benefits in three categories: a reduction in inventory by reducing queues of material ahead of final assembly; improvement in purchasing due to use of commitment reports, better supplier tracking and negotiation; and a reduction of clerical staff.

Material requirements planning (MRP) capabilities that are fully integrated with the MS-11 system are utilized as an inventory rescheduling mechanism. When schedules change for any reason, these changes can be reflected at all levels down to individual purchased parts and raw materials. "Real-time operations are the key point in having better confidence regarding the location of material orders and their due dates," Gray commented.

Also contributing to inventory control are commitment reports, another byproduct of the MS-11 system. A detailed and aggregate tally of all items promised to be bought from vendors in this and all future periods, the commitment report is analyzed by Gray and his supervisors on a regular basis.

"When the aggregate for a current month is running higher than our estimate of what the aggregate should be, we can look at all the items and determine which jobs they are scheduled for," Gray explained. "From there, we decide which purchases should be delayed." The company uses the software's commitment report output like a valve, controlling the dollar flow in to make sure it is balanced with the dollar flow out. "It's like hitting ducks with an advance lead. Except in our case, the lead is something like six months."

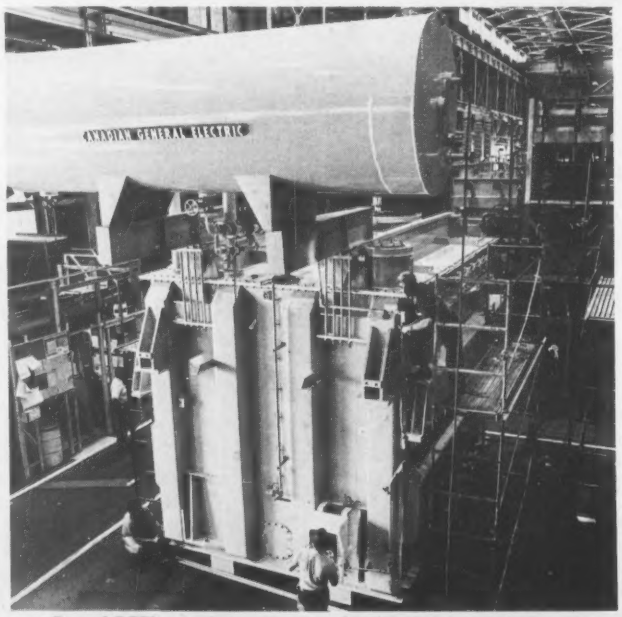
Pressure Suppliers

"Up-to-the-minute" MRP reports from MS-11 are used to put significant pressure on suppliers to improve their material shipments, Gray continued. For example, whenever supplier sales and marketing people call on buyers, the buyer first takes them to a terminal and prints out the open order status for that supplier. The discussion then becomes, "Before we talk about new orders, let's talk about what you still owe us."

"And, suppliers don't get additional orders until their open-order status starts to get cleaned up," Gray said.

MRP and open-door reports are also used to negotiate with suppliers for better prices. "It's a great starting point at the bargaining table," he added.

The company's third objective — reducing clerical staff — was accomplished through attrition.



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Ford Motor Co. Turns to Computers To Rev Up Sales, Brake Rising Labor Costs

Special to CW

DEARBORN, Mich. — The American automobile industry is in trouble. Plagued by rising materials and labor costs and slumping new car sales, many manufacturers have resorted to plant shutdowns, across-the-board pay cuts and government loans in order to survive.

Some car builders have turned to computers to streamline manufacturing processes or to sharpen up administrative tasks.

At the Ford Motor Co., for example, two Hewlett-Packard Co. minicomputers are currently being used by the firm's Engine Division to manage the firm's receiving and warehousing processes. Located here and in Cleveland, the computers save the company about $1.5 million per year, according to Phil Henson, project leader of material control systems for the division.

Ford's Engine Division actually consists of seven plants located throughout the U.S. and Canada. Each one produces a different size engine for a particular make of car. In 1980, more than two million engines and 2,300,000 fuel tanks were produced by these plants.

Untimely Data

In the past, all shipping, receiving, and warehousing functions were, for the most part, handled manually. At the end of the day, figures would be keypunched and batched through a mainframe computer. Unfortunately, there were a lot of problems with this system, Henson explained.

"Our data was untimely. We lost four hours of receipts every day because the cutoff for the mainframe is 10 p.m., even though plant operations continue until 2 a.m.," he said. "As a result, we often found ourselves overstocked, simply because an order received at 10:01 wouldn't show up until a day after it was actually received."

Although Henson knew some sort of computer control was needed, at that time he was not sure what kind of a system to install. He did know that the computer would be required to perform four functions: provide real-time inventory control; edit receiving information and provide a receiving data file to the mainframe computer; track inspections, thereby establishing a quality control procedure; and forward transactions to the accounts payable system.

Ford put the project out for bid. In the meantime, since HP computers were being used at several other Ford divisions — with reportedly better than 99% uptime — Henson also carefully studied these systems. Ford eventually decided to stick with the same vendor.

Presently, Ford has an HP 3000 Series III with 1M byte of memory here at its Dearborn motor plant. The system also has two HP 7925A disk drives with a total of 240M bytes of storage, an HP 7970E tape drive used for backup, 14 2621A terminals and seven 2645A terminals and four printers.

At its Cleveland installation, the company has an HP 3000 Series 33 with 768K bytes of memory, 120K bytes of disk storage, four terminals

(Continued on Page 44)

Because parts are stored on pallets often stacked 25 feet high, Ford uses a printer to create oversized tags.

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Ford Turns Right to Computers

(Continued from Page 43)

and two printers. Both plants use HP's MPE/3000 operating software, and have developed their own applications software, Henson stated.

Distributed System

Eventually, the company will install computers at its other engine plants and connect them in some sort of a distributed system, Henson said. For instance, plans for the near future include installation of an HP 3000 Series 44 here to be used for online shipping and in-process control, a Series III at it Essex plant, either a Series III or Series 44 at its Lima operation and two Series 33s in a plant currently under construction in Mexico.

"We will have a distributed system with all of the HP 3000s being able to talk to each other as well as feeding data into the mainframe," Henson observed.

The Dearborn plant is typical of the way the Engine Division computer systems will be set up and operate. The data base consists of five files: a parts file, containing some 3,000 items of inventory; a supplier's list file, with 1,100 vendors; a warehousing location file; an inspection frequency file; and a receipt transaction file.

When a new part is received, the packing slip is forwarded to the computer operator, who enters the pertinent data into the computer. The data is then validated by crosschecking the entered information against the data in the computer's file, Henson said.

After the information is entered into the data base, the HP printers produce tags with large printing that contain the parts number, part quantity, warehouse location, production area and quality control information. This label is then attached to the respective part.

Next, the data is entered into a receipt transaction file, while the parts file is automatically updated to include the present warehouse quantity, Henson explained.

The Dearborn plant builds about 2,200 engines per day. Once management has determined what type and how many engines are to be built, a build schedule is entered into the HP 3000 computer, which prints out a list of available parts. Then, by entering the part number and the quantity required, the computer generates a pick list.

Using this list, parts are pulled from the warehouse and the engine is built.

At the end of the day, the data is transferred to the main computer and the receiving process completed.

Computers in Ford's Dearborn and Cleveland plants are reportedly saving the automaker $1.5 million annually. The line printer shown above issues oversized tags that make locating parts within the warehouse easier.

Meets to Cover DP Planning, Productivity

ROCKVILLE, Md. — "How to Develop an Effective Long-Range DP Plan," "Personnel Productivity in Data Processing" and "How to Establish a Successful DP-User Coordination Function" are workshops that will be held by Keston Associates in U.S. cities this year and next.

The first seminar will be given by Dr. Robert Keston in Monterey, Calif., this month, from Nov. 16-20, and in Ft. Lauderdale, Fla., next month from Dec. 14-18. It will also be given in Washington, D.C., San Francisco and Annapolis, Md.

"Personnel Productivity" will be given in Ft. Lauderdale, Washington, San Francisco and Annapolis; the seminar on "DP-User Coordination Function" will be given in Ft. Lauderdale, Annapolis and Jackson Hole, Wyo. The fee for the workshops is $795 per person in 1981 and $875 per person in 1982. Keston Associates is at 11317 Old Club Road, Rockville, Md. 20852.

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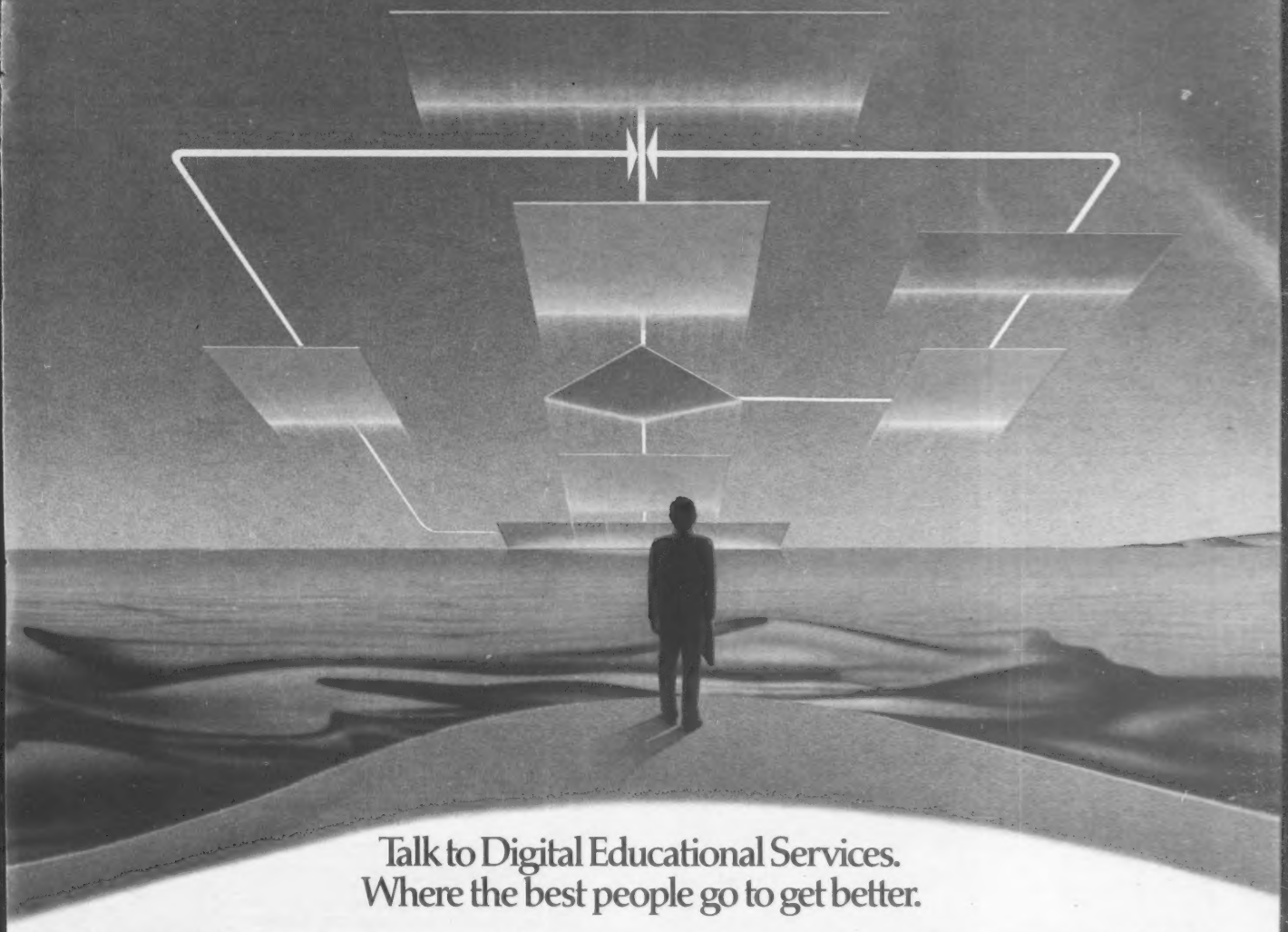

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Alpha Micro Users to Meet

MIAMI — The Alpha Micro Users Society (Amus) will hold its second annual meeting here on Jan. 24-29 at the Deauville Hotel.

In keeping with the theme of this year's conference, "From Micro to Mini: What Is Required?," Amus will present a number of workshops, panels, classes, exhibits and equipment demonstrations aimed at the business person and programmer who wants to improve current skills. Emphasis will also be placed on data base systems available for Alpha microcomputers, a spokeswoman said.

The five-day show will also feature both hardware and software exhibits focusing on the latest in memory, peripheral and applications package developments.

The registration fee for the show is $180 for the first person and $140 for each additional person from the same company. Exhibitors will be charged $350, which includes the registration fee. Special hotel rates for those attending the meeting are $60 per day, single or double occupancy.

Additional information on the group or the meeting can be obtained from Alice Dobbs at William L. Miller & Associates, Inc., 8380 S.W. 151 St., Miami, Fla. 33158.

Booklet Outlines Ties Between Micrographics, OA

BETHESDA, Md. — The International Micrographics Congress (IMC) has published a booklet outlining the relationship between office automation and micrographics.

Through diagrams, illustrations and text, "The Office of the Near Future" offers a concise description of office automation and deals with such subjects as document creation, automated retrieval and hard-copy production. The publication, designated IMC 107, costs $3.50 or $1.00 each in bulk orders of 100 copies or more. All orders must be prepaid in U.S. currency, according to a spokesman.

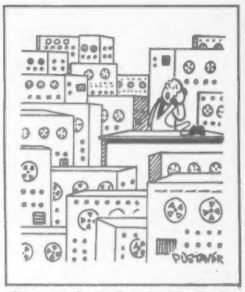
IMC's Publications Sales Department can be reached through P.O. Box 34404, Bethesda, Md. 20817.

Paper Covers New Approach To Management

BETHESDA, Md. — Gary Slaughter Corp. is offering a free white paper entitled "Manager's Role in Improved DP People Communications, Motivation and Management."

The 23-page paper discusses a reportedly new DP management approach to managing DP people.

The paper is available from the firm at 4810 Montgomery Lane, Bethesda, Md. 20814.



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Price Heads International DPMA

PARK RIDGE, Ill. — Donald E. Price, dean of administrative services at Sierra College in Rocklin, Calif., has been elected international president of the Data Processing Management Association (DPMA).

At the same time, DPMA announced the elections of J. Crawford Turner Jr. as international executive vice-president; Carroll L. Lewis as international secretary-treasurer; and Joseph A. Federici, Eddie M. Ashmore and C. William Smith Jr. as international vice-presidents.

The elections were held in San Francisco last month during the DPMA's 30th anniversary international conference and business exposition [CW, Nov. 9].

Price has been a member of the DPMA since 1963 and has a total of 22 years experience in data processing.

He is past president of three DPMA chapters and has also served as president of the association's Education Foundation, which has reportedly developed the computer information systems model curriculum for colleges and universities.

Dr. Robert Larson Elected President of IEEE for 1982

NEW YORK — The Institute of Electrical and Electronic Engineers (IEEE) has announced the election of three members to lead the worldwide professional organization during the coming year.

Dr. Robert E. Larson, president of Systems Control, Inc. in Palo Alto, Calif., has been selected as the IEEE's 1982 president. James B. Owens, retired president of Gould-Brown Boveri in Rolling Meadows, Ill., is now the organization's president-elect and Dr. Thelma A. Estrin, a professor of engineering in the department of computer science at the University of California at Los Angeles, has been elected executive vice-president.

Larson, who succeeds 1981 IEEE president Dr. Richard W. Damon, is a cofounder of Systems Control and previously worked at IBM Hughes Aircraft Corp. and SRI International, Inc. Since 1973, he has also been a consulting professor at Stanford University, an IEEE spokeswoman said.

Larson has authored three books — *State Increment Dynamic Programming, Principles of Dynamic Programming* and *Distributed Control* — and has written more than 120 technical papers. He has also received a number of awards in his career, including the 1968 Donald P. Eckman Award for outstanding achievement in the field of automatic control.

Owens has been with the Gould Group since 1976, where he has progressively served as vice-president of the firm's Electrical Systems Group, corporate vice-president and president until his retirement last year. Among his accomplishments, he holds 18 U.S. patents and has authored a number of technical papers in the field of high-voltage switching equipment.

Owens has been a member of the IEEE since 1945.

Estrin has been with the University of California since 1961 and specializes in the applications of electronic instrumentation and computers in the field of neuroscience. She was previously the director of the Data Processing Laboratory at the University's Brain Research Institute.

She has been a member of the IEEE since 1958 and was named a Fellow in 1977.

Estrin has also been a member of the boards of directors of both the Biomedical Engineering Society and the Association for the Advancement of Medical Instrumentation and has served as vice-president of the Alliance for Engineering in medicine and biology.

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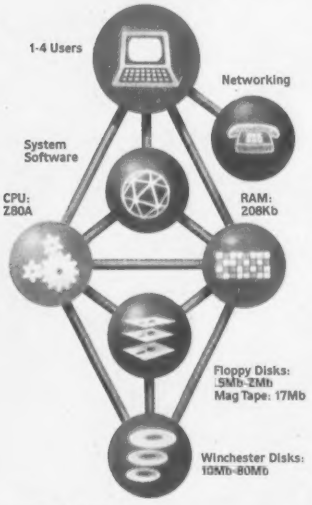

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Calendar

Jan. 4-7, San Francisco — **CICS/VS Application Design.** Contact: Dianne Halper, On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Jan. 4-8, Chicago — **CICS Command Level Programming.** Contact: Priscilla Goudrealt, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181

Jan. 4-8, New York — **CICS/VS Application Programming Command Level.** Contact: Dianne Halper, On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Jan. 4-8, Washington, D.C.— **Data Communications Systems and Networks.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052. Also being held Jan. 11-14 in Washington, D.C.

Jan. 5-7, San Francisco — **Computer Graphics.** Contact: Bob Sanzo, Director of Marketing, Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Jan. 6-8, Miami — **Automated Office Implementation Workshop.** Contact: Department E, National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Jan. 6-8, Philadelphia — **Data Coummunications Fundamentals.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 6-8, New York — **Data Base Fundamentals.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 6-8, Teaneck, N.J. — **Project Management and Control.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 6-8, Philadelphia — **Structured Techniques for Systems Design.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 6-8, Sunnyvale, Calif. — **Capacity Management Forum.** Contact: Sondra Schwartz, Boole & Babbage Educational Services Division, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Jan. 6-8, Honolulu, — **Fifteenth Annual Hawaii International.** Contact: Ralph H. Sprague Jr., Emily M. Yano Jorgensen, Office of Management Programs, College of Business Administration, University of Hawaii, 2404 Maile Way C-202, Honolulu, Hawaii 96822.

Jan. 7-8, Arlington, Texas — **Writing For Results: A Workshop for EDP Professionals.** Contact: Priscilla Goudreault, Q.E.D Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 7-8, Washington, D.C — **Protocols for Packet Switching.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052. Also being held Jan. 11-14 in Washington, D.C.

Jan. 7-8, New York — **Computer/Micrographics Interface.** Contact: Battelle, Seminars and Studies Program, 4000 N.E. 41st St., P.O. Box C-5395, Seattle, Wash. 98105.

Jan. 7-8, San Francisco — **How to Protect Computer-Based Information and Prevent Computer Abuse.** Contact: The Bureau of National

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Affairs, Inc., 1231 25th St. N.W., Washington, D.C. 20037.

Jan. 9, San Mateo, Calif. — **IBM OS/VS JCL & Utilities.** Contact: ADC Associates, 960 San Antonio Road, Palo Alto, Calif. 94303.

Jan. 11, Los Angeles — **DOS/VSE Concepts & 4300 Facilities.** Contact: The Registrar, Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211. Also being held Jan. 11 in Washington, D.C.

Jan. 11-12, Nashua, N.H. — **Material Requirements Planning.** Contact: New Hampshire Resource Center, New Hampshire College, 2500 N. River Road, Manchester, N.H. 03104.

Jan. 11-12, Scottsdale, Ariz. — **Office Automation: Current Realities, Organization, Guidelines for Implementation.** Contact: Joan Merrick, Datamation Institute Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

Jan. 11-12, New York — **Integrating Word Processing and DP.** Contact: Joan Merrick, Datamation Institute Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

Jan. 11-13, Sunnyvale, Calif. — **MVS Systems Management Workshop.** Contact: Sondra Schwartz, Boole & Babbage Educational Services Division, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Jan. 11-13, Wellesley, Mass. — **On-Line Systems Design.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan 11-13, Arlington, Texas — **EDP Quality Assurance.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 11-14, Washington, D.C. — **Voice Input/Output (VIO): Communicating With Machines With the Spoken Word.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052. Also being held Jan. 11-14 in Washington, D.C.

Jan. 11-15, Wellesley, Mass. — **Systems Design Workshop.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 11-15, Atlanta — **Network Conference & Exhibition '82.** Contact: Management Office, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Jan. 11-15, San Francisco — **Structured Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Jan. 11-15, Cleveland — **Structured Analysis/Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Jan. 11-15, Los Angeles — **Structured Design/Programming Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Jan. 11-15, New Orleans — **Structured Design and Structured Programing Workshop.** Contact: Dr. Ned Chapin, Infosci, Inc., Box 7117, Menlo Park, Calif. 94025.

Jan. 11-22, New York — **PL/I Programming.** Contact: Ellen Garfield, Software Education Corp., 1114 Ave. of

(Continued on Page 51)

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Q. Can I be confident the Recovery Center will work?

A. You can if you can demonstrate to yourself and to your management that you have a tested backup capability that runs your critical applications. SUNGARD subscribers have conducted over 600 successful tests of their backup systems. Their early and continuous testing has the support of our technical professional staff, which has the skills and experience to make that job easier.

Q. How are tests supported?

A. At SUNGARD, they're supported with qualified technical SUNGARD personnel from every appropriate discipline. If you don't think you need experienced technical support (software, telecommunications, operations) to achieve a testable backup capability, you may have too many people on your staff.

The experience gained by a Recovery Center staff in supporting customer testing improves your ability to develop an effective capability. The absence of that experience (or worse, the absence of a Recovery Center staff) has the opposite effect.

Q. Can I back up my critical networks?

A. You can at SUNGARD. Our most effective answer to this question is the many users who have a tested capability today at SUNGARD. Non-believers are converted by a visit to our centers. At our Philadelphia Centers, we have in place and operational more than 150 modems of various manufacturers. Dial backup units, central office connections, cabinets, cabling and over 100 3705 ports are in place and operational. All these elements for network backup are interconnected through a Network Control Center which allows for rapidly customizing the capability to the unique requirements of each user. And all these elements (except the modems) are in our basic price. If you can't back up your on-line systems, you haven't accomplished anything.

Q. Is the hardware adequate to my needs, current and compatible, or is it "tired iron"?

A. You shouldn't sign for a 370-based backup system when you already have the 3081 in your plans. The 165 is unsupported now. What IBM version of the SP will leave the 168 behind? At SUNGARD we have current IBM hardware installed and a firm commitment to the 3081. We replaced our 168 in 1979. And we're committed to remaining current, not only with processors, but also with peripherals.

Q. Is the facility itself suitable and secure?

A. Each of the three SUNGARD Recovery Centers has an average of more than 30,000 square feet dedicated to supporting the recovery needs of SUNGARD subscribers. This includes, in addition to the backup configuration, a ready-conditioned space in each center with sufficient cooling and power for a replacement 3033 and associated peripherals. Four thousand square feet of office and terminal space is equipped with power and telephone jacks for your recovery team. And the entire facility is secured with a controlled access system and fire detection and protection systems you should expect in a first class center.

Sungard™ Centers have the answers.

Q. Who are the other subscribers, and are they satisfied with their Recovery Center?

A. As a SUNGARD subscriber you will have the right to know who the other users of your backup center are. As a SUNGARD prospect we'll share with you the names of Fortune 500 Industrials and Fortune 200 Financial institutions which have agreed to let us refer you to them to help you evaluate SUNGARD. You'll recognize the names and appreciate their serious commitment to providing the best available Recovery Centers for their installations. Our subscribers can report to their management with confidence that they have a tested recovery capability that works.

Q. What is the true cost of having a Recovery Center to go to in the event of a computer disaster?

A. We're the high-priced spread, but you get much more with SUNGARD. Our standard offering includes everything you need, so your cost with SUNGARD is very visible. Hidden costs to make other centers usable, especially network backup, can drive their price past ours.

We think that a workable disaster recovery solution is part of the cost of doing business in today's computer-dependent world. When compared with other accepted costs of doing business, your monthly recovery fee at SUNGARD is:

- Less than the cost of a security guard around the clock.
- About half of what you pay for monthly maintenance on your processor.
- Less than one string of disk drives or bank of tape drives.
- The equivalent of about $1.50 per square foot per year, including equipment, test shifts and technical support.

Q. Are there other costs?

A. Not for the SUNGARD Recovery Center. There is obviously cost associated with developing and maintaining your recovery capability. Our contingency services organization can bring its experienced staff to your site, to assist you in the development of that capability at your option. But the cost of having a second site at SUNGARD, including ample test shifts and extensive network backup equipment, is all in our basic fee.

Q. Can I test remotely?

A. Yes, you can. Our plan includes the ability to run your backup system without sending your recovery team to the SUNGARD Center. We still suggest that you come to the Center once a year to test, in order to remain familiar with your second center.

With remote testing and the opening of our third SUNGARD Center in Chicago in December, and our West Coast and Southwest Centers planned for 1982 and 1983, distance should not be a significant factor. And this network of SUNGARD Centers offers you added protection in the event that your primary SUNGARD Center is occupied by another subscriber experiencing a disaster.

At SUNGARD, we are committed to providing a quality nationwide service. Recovery services is SUNGARD's only business. We originated the concept and assembled an organization of talented, experienced professionals to support your needs. Nobody can touch SUNGARD's experience, commitment and capability in providing disaster recovery services.

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Calendar

(Continued from Page 49)

the Americas, New York, N.Y. 10036.

Jan. 12-13, Washington, D.C. — **Computer Graphics: Technology & Applications.** Contact: Eloise Wenker, National Computer Graphics Association, 2033 M St., N.W., #300, Washington, D.C. 20036.

Jan. 12-14, New York — **Computer Media Management Advance Tools & Techniques.** Contact: Helen Torok, Stored Information Systems, 140 Cedar St., New York, N.Y. 10006.

Jan. 12-14, Atlanta — **Productivity in Information Systems: Strategic Use of Tools and Techniques.** Contact: U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

Jan. 12-15, Toronto, Canada — **Structured Requirements Definition.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

Jan. 13-14, Wellesley, Mass. — **User's Role in Systems Development.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 13-14, Los Angeles — **Computer in Pharmacy.** Contact: Sylvia Vogelman, Seminar Manager, Center for Retailing Management, 425 Park Ave., New York, N.Y. 10022.

Jan. 13-15, Raleigh, N.C. — **Data Analysis.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 14-15, Wellesley, Mass. — **Effective Presentations.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 14-15, Houston — **Protecting Data & Information.** Contact: Digital Equipment Corp., Educational Services, Seminar Programs, 12 Crosby Drive, BU/E58, Bedford, Mass. 01730.

Jan. 17-20, Orlando, Fla. — **The Medical Record Department – The Hub of a Hospital Information System.** Contact: W.V. Rosqvist, Hissg, 2415 S. 2300 W., Salt Lake City, Utah 84119.

Jan. 17-21, Harrisburg, Pa. — **1982 Eastern Region Prime Group Conference.** Contact: Arnold Spitalny, Eastern Region Prime Users Group, ITT Advanced Technology Center, One Research Drive, Shelton, Conn. 06484.

Jan. 17-22, Toronto, Canada — **DP Training Management Managers Workshop and Advanced DP Training Management.** Contact: Deltak, Inc., 1220 Kensington Road, Oak Brook, Ill. 60521.

Jan. 18-19, Los Angeles — **Software Project Management.** Contact: Digital Equipment Corp., Education Services, Seminar Programs, 12 Crosby Dr., BU/E58, Bedford, Mass. 01730.

Jan. 18-19, Washington D.C. — **Industrial Application of CAD/CAM Computers.** Contact: Eloise Wenker, National Computer Graphics Association, Seminar Program, 2033 M St., N.W., #300, Washington, D.C. 20030.

Jan. 18-19, Philadelphia — **Writing for Results: A Workshop for DP Professionals.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 18-19, New York — **Tomorrow's Paperless Office.** Contact: Business Seminar, Ph.D. Program in Business, City University of New York CUNY, Box 328, 17 Lexington Ave., New York, N.Y. 10010.

Jan. 18-21, Wellesley, Mass. **Structured Programming: Techniques for Productivity.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 18-22, Raleigh, N.C. — **CICS Command Level Programming.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Jan. 18-22, Arlington, Texas — **System Analysis Workshop.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

"We searched for two years for a magnetic tape input to our IBM System/34. It was a tremendous relief to discover that the Mitron STD 1600 gives us that capability."

Kathy Mast
Data Processing Manager
Communications Specialists, Inc.
Printing and Direct Mail Services
Austin, Texas

Communications Specialists, Inc., of Austin, Texas installed the Mitron STD 1600 Data Communications Terminal to give magnetic tape capability to their IBM System/34 in the fall of 1980. Using the Mitron, CSI can directly access magnetic tapes and supply magnetic tape files. You can do the same thing with your IBM System/34.

"With the Mitron I have total control. We can now do it all — without conversion equipment. I can read anything that comes in without the added cost and a two or three day delay using a service bureau," says Kathy Mast. "The Mitron STD 1600 is easy to install through the IBM System/34 communication port. It's so convenient and economical to operate, and of course magnetic tape costs about 1/12th as much to use as diskettes."

You can either lease or purchase the Mitron STD 1600. It is available with 1200' or 2400' reels.

The Mitron STD 1600 can also be used as an off-line, tape-to-tape terminal over the dial-up or private line network.

"We have simplified our production tremendously. And, I've just been elated with the people at Mitron and the way they have worked with us to solve any problems," adds Kathy Mast.

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MITRON
Systems Corporation
2000 Century Plaza
Columbia, Maryland 21044

EDITORIAL

Time Running Out

If you are not prepared to face the time and expense involved in an extensive conversion process from the Cobol-68 and Cobol-74 standard to the Cobol standard being proposed by the American National Standards Institute's X3J4 committee, it is time to take pen-in-hand and make your feelings known. As of Feb. 14, 1982, it will be too late for DP managers to register complaints about the standard, which has been critized by some end users for its reported incompatibility with the 1974 version of Cobol.

One particularly outspoken critic, Joseph T. Brophy, senior vice-president of the Travelers Insurance Co., has already indicated that he will sue if the standard is passed as it stands [CW, Nov. 16].

The proposed Cobol standard offers added function and structured programming features, but, as Brophy said, "it has been made an all-or-nothing offering." If the standard is passed, users who want to add these features may be forced into an expensive conversion in order to comply with other facets of the proposed revision.

The ALTER statement, for example, is deleted from the proposed standard and it also contains some 56 new reserved words. Programs written to meet the current Cobol standard would, in effect, have to be rewritten to comply with the new version's requirements, according to Brophy and other critics.

Computerworld has received a number of inquiries about the proposed standard and the Data Processing Management Association recently went on record as being strongly opposed to the standard [CW, Oct. 26]. Large companies in particular are attempting to gauge how much of an effect the standard will have on internal operations if it is passed. The concerns are real and valid, but the time left to register end-user reactions is quickly running out.

The standard is currently available for public review and comment from the Ansi X3 Committee for Information Systems. Brophy is urging companies to not only respond to the standard, but also to join the X3 committee and make their voices heard on the inside, while the proposed standard is being developed and discussed.

Copies of the Ansi proposal are available for $25 and any comments should be expressed before the Feb. 13, 1982 deadline. Orders or comments may be sent to X3 Secretariat, Cbema, Attention: dpANS X3.23-198X, Suite 1200, 1828 L St., N.W., Washington, D.C. 20036.

'The line forms at the right'

DATA PAST

Ten Years Ago
Dec. 1, 1971

NEW YORK — Less than 24 hours after Sperry Rand announced its Univac Division would buy the RCA customer base, Univac officials requested an immediate conference with the RCA Computer Users' Association (CUA).

David Rau, CUA president, read about the Nov. 19 agreement in the next day's morning newspaper. A few hours later, Univac officials telephoned and invited him to an all-day meeting with President G.G. Probst and other Univac officials to iron out user problems and to emphasize Univac's commitment to a smooth transition, Rau said.

Rau was "impressed" after the Nov. 22 meeting, especially with Univac's willingness to work with the user group. The company is "dedicated" to winning RCA customers, he said.

Five Years Ago
Dec. 13, 1976

HILTON HEAD, S.C. — Distributed data processing will significantly change the way non-DP persons operate within a corporation, according to consultant George Glaser.

Speaking at a conference on distributed DP held by International Data Corp. here, Glaser said DP managers must be prepared to decentralize the DP management functions along with the hardware.

"I doubt any organization can limit its venture into distributed DP to hardware only. Hardware is in the hands of the users and they become accustomed to having it available, they will want still more devices, more processing power and more staff," he predicted.

The cost of such "organizational dislocations" will be high and some DPers may not adjust, he said.

LETTERS

Unclassified Computing

I enjoyed the product spotlight on supercomputers [CW, Nov. 9]. There was one error, however, in the table on Page 17 that listed the Cray Research, Inc. Cray-1 installed base. The computers listed as installed in May 1978 and Sept. 1981 at the Magnetic Fusion Laboratory for classified applications are in fact installed at the National Magnetic Fusion Energy Computer Center (NMFECC) and are used entirely for *unclassified* scientific computing.

While this error might appear trivial, the fact that the entire magnetic fusion energy research program is unclassified has allowed us to create a large national computer network accommodating virtually all fusion computing with the NMFECC as its hub. Computing on this network is limited for economic and programmatic reasons to contractors of the Office of Fusion Energy, Department of Energy, but none of the applications are classified.

We are quite proud of this network. It allows access to state-of-the-art computing by all fusion contractors, regardless of their location. It has been successfully used for theoretical studies, engineering design and experimental data processing.

Major equipment at the NMFECC includes a Cray-1/S, a Cray-1, a Control Data Corp. 7600, a CDC 6400, a CDC 38500 mass storage device, a Braegen Corp. automatic tape library and a Digital Equipment Corp. Decsystem-10. Several smaller computers are used as communications processors.

The five largest remote nodes are built around Decsystem-10s; smaller nodes include VAXs or PDP-11-based remote user service stations. Although the network is configured as a star, users at any node can log onto the computers at any other node or send files to any other node.

Most of the systems software has been written and maintained by the staff of the NMFECC, with assistance from staff at some of the major nodes.

David B. Nelson
Chief
Fusion Theory and
Computer Services Branch
Office of Energy Research
U.S. Department of Energy
Washington, D.C.

Clearing Up Confusion

Two points about the article ["Independent Applications Market Fragmented," CW, Nov. 16]:

One, the International Data Corp. (IDC) chart on software submarkets was printed from a prepublication copy that contained a typographical error. The percentage listed under the 1985 systems software bar for independents should read 8%, not 89%. The height of the bar correctly represents the lower percentage.

Second, readers might be confused when comparing figures from Input, Inc., taken out of the annual Association of Data Processing Service Organizations, Inc. (Adapso) study, in the third paragraph, and figures from IDC, which are used throughout the rest of the article.

The $15 billion 1980 revenues quoted from Input/Adapso refer to revenues from computer services, contract programming and professional services and custom software in addition to packaged software. The $3 billion figure from IDC refers just to packaged software. The IDC figures are from our recently published "Packaged Software Statistical Reference Book."

John Gantz
Director, Software and Services
Information Program
International Data Corp.
Framingham, Mass.

GETTING AHEAD IN DP /Donald J. Berardo

What to Do When You've Been Passed Over

You're a systems development manager and have done well at it, you believe, for the past two years. Your raises over the last four years have averaged 15%, indicating that your ability has been noticed.

Lately you've had your eye on a new telecommunications area where some of your company's most talented people are working. You've dropped hints about your interest to your boss and to the boss in telecommunications.

It is now appraisal time and you're expected to be promoted into the area with another handsome raise. But in your appraisal meeting your boss looks nervous and eventually informs you that you won't be moving to telecommunications and that your raise this year will be 5%. He says the two of you can discuss this further in another meeting. Your mind is racing, wondering what's wrong. The next day you see in the company newspaper that one of your close competitors has gotten the telecommunications job. What would you do?

Remain Calm

First, don't panic or act impulsively or roll over and die. Fight your urge to call someone — your boss, his boss, people in your network — and make angry remarks or accusations.

Since you are already in a vulnerable position, it's foolish to do anything to undermine yourself further. Though some of your allies might offer sympathy at first, they will eventually dislike your sour grapes and tantrums.

If you are that surprised at the way things have turned out, one of two things is wrong: either the organization and the chain of authority is fouled up, or you have not been reviewing yourself and the organization clearly.

After you have calmed down, your next step is to go back to the basics. You must reappraise yourself, the organization, your network, your position, everything. Take another look at the chain of authority and the "powers" in your company. Can you detect any shift in these areas? Does the corporate mission seem to be changing? Has there been a lot of turnover in upper management lately? Are there rivalries in your division or elsewhere that you haven't noticed?

The most difficult appraisal, of course, will be of your own performance. You must be completely honest with yourself.

List all the reasons that might possibly have contributed to what occurred. Have you allied yourself with the wrong people? Are certain users dissatisfied with you? Are you on good terms with your subordinates and your boss? Have you been late with some projects recently? Do you have problems that have caused you to make a lot of personal phone calls? Are you sure you've done well at the things that are most important to upper management and users?

Once you've compiled this list, decide which items are actually true, which are paranoid and which are insignificant or unlikely. To help you do this, look over your personal files for information about who said what about your latest projects, your performance and your chances for a raise and promotion. When you have your follow-up meeting with your boss, you want to be prepared with factual evidence, not emotional horror stories or vague memories.

You should also examine the person who got the job — is he a better candidate than you? If so, admit it and make plans to improve.

Planning for your meeting with your boss, in fact, is that next step. If possible, wait for your boss to invite *you* to the meeting, but, in any case, it should take place three-to-seven days after your appraisal.

You should go into the meeting with an air of confidence and loyalty — don't try to make your boss feel guilty, don't solicit pity and don't act as if you are preparing to go elsewhere.

Be professional and open and indicate your eagerness to understand what went wrong and how you can get back on track. Also, make it clear that you don't want it to happen again and want to talk about new opportunities.

Lose a Battle, Win the War

The two of you should write and exchange memos stating what you both have agreed to do. If the memos conflict, arrange another meeting and repeat the process.

This isn't the time to start looking for another job unless your careful self-evaluation sharply contradicts your boss' or it becomes clear that the chain of authority is hopelessly against you.

Remember — there's a difference between failure and failing temporarily. A negative appraisal, if responded to correctly, can be the positive force needed to get you moving in the right direction again with new goals in mind.

Berardo is a management counselor and career therapist. He is a vice-president with the Meld Group in Newington, Conn., publishers of a monthly newsletter on management development.

"Getting Ahead in DP" is a new column that was conceived to improve those nontechnical skills necessary for advancement in the business world. The column will appear in these pages once a month.

HUMAN CONNECTION /Jack Stone

How 'New Generation' Acquires DP Skills

I try valiantly to avoid reflecting on it, but the plain fact is that I received my doctorate in electrical engineering so long ago that digital computer technology was only a laboratory curiosity and course offerings in the subject were merely fantasies.

Like many of my contemporaries, I had to really struggle through the manuals to try to learn systems and programming on my own and then gerrymander some computer time to figure out what was going on. It took a lot of computer power to do it.

New Generation

This is not true for the new generation. Many of them acquire years of computing experience before they even get to college.

An example is Steve Reznikoff, a 23-year-old from Nashville, Tenn., who graduated recently from the University of Missouri with a B.A. in economics.

Reznikoff is looking to enter the job market as an economist or banker, with a specialization in econometrics and statistical forecasting. Here's what he had to say during the course of my interview with him.

Q: When did you first get interested in computer technology?

A: I've always been fascinated by electronics, having been an avid reader in the subject as long as I can remember. I received continuing encouragement from my mom and dad, who bought all sorts of electronic equipment for me.

My first hands-on experience occured when I was in eighth grade. We were permitted to use a hardcopy teletype terminal installed at the local high school, which communicated with a remote Hewlett Packard Co. HP 3000. The major applications were game programs, but the machine did allow access to the Basic compiler and gave me the capability I needed to learn programming.

Q: How did you relate to the machine?

A: It was really a challenge, certainly the most compelling subject in my curriculum. I soon found myself walking the two-mile round trip to the high school every day to spend two or three hours reading manuals, developing test programs or operating the terminal. I continued the effort at about the same level throughout my high school years.

Q: How did your computer interests compare with those of your

(Continued on Page 54)

READER COMMENTARY/Camille Kostosky

Programmers Don't Need To Communicate in English

There are many like Charles Verbisky, author of the reader commentary ["Learn to Communicate in English and Basic," CW, Nov. 9], who are quick to condemn the poor communications skills, terrible spelling and bad grammar of today's computer programmers. Just as a small child will make fun of a foreigner by mocking his garbled language and scribbled writing, only the child's ignorance shows. The inability to communicate with the foreigner does not mean the foreigner is unintelligent or that he cannot communicate with others of his own group.

I have never met a good programmer who cannot relay his thoughts to another programmer. Using English may at times be cumbersome in explaining a program's logic, but try giving that same programmer a pencil and even a scrawled facsimile of a system flow chart result in a universal language that guarantees to get the message across.

Let me point out that the "kiddie programming school" and "summer camps" to which Verbisky refers do not a good programmer make. As I would refrain from calling myself a technical writer after one published letter to the editor in *Computerworld*, Verbisky should extend the same courtesy in giving our highly trained professionals more credit than a degree from a summer camp.

Also in his article, he is quick to attack the Cobol spelling of the word "THRU" compared to the English version "through." Even our "kiddie programmers" would know these are both Cobol-reserved words and interpreted equally by the computer.

To quote Verbisky: "Programming syntax errors — computer spelling and grammar — are unforgivable sins, while English syntax and grammar errors are glossed over as being of secondary importance."

The Forgiving Language

Communicating in English is very forgiving. When writing a letter or memo a left-out period or capital letter will not alter the message. With Cobol, this is a little different. Drop only one period or misspell one variable and the computer will simply not understand.

Why even waste the time comparing the two when what we are actually talking about is understanding? What we try to achieve in any language is the easiest and simplest way to get the communicatee (be it human or machine) to understand. Cap-

(Continued on Page 57)

How the 'New Generation' Acquires DP Skills

(Continued from Page 53)

schoolmates?

A: I probably was more eager than most, but there were a large number of students who spent many hours outside of class studying programming and working on the terminal. I would say that the students generally viewed the computer as a subject of serious study rather than a novelty.

Q: How far did you progress by the time you graduated from high school?

A: I didn't reach the ranks of the professional programmer, by any means, but I certainly made some headway.

For example, I felt comfortable programming in Basic and Fortran and could perform the analysis of a small system. And I believed that I was capable of operating most well-designed systems after reading the manuals and experimenting with the programs.

For example, while in high school, I developed a fairly complex inventory control system for my dad's retail business and also taught several sessions of Basic programming as part of the student/teacher program. By that time, the terminal was upgraded to a CRT terminal and it made the teaching a lot easier.

Perhaps the most significant benefit I received from my secondary school computer systems experience was not the systems and programming skills I acquired, but rather the development of a new intellectual discipline to attack the solution of complex problems in an organized way.

I found this discipline to be invaluable in college and I would expect it to be important to me no matter what I do in my professional life.

Letters to Stone should be addressed to him at Box 207, 1377 K St., N.W., Washington, D.C. 20005.

READER COMMENTARY/Edmond H. Weiss

Five Laws of User Documentation

The '80s is the decade for better documentation. At last, nearly everyone in the business has realized the truth: Documentation *is* the product. Without coherent, useful, readable documents — guides, manuals and training packages — even the best hardware and software will remain forever in inventory.

But this realization is new, so most of the people assigned to develop user and customer documents (many of them drafted for the job) are new to the field. To help this emerging army of "documentation specialists," who do not yet know the natural limits of their profession, I have assembled five laws of user documentation.

Law 1: What Is Convenient and Inexpensive for the Documentor Is, in General, Inconvenient and Expensive for the User.

There is no more elemental principle of communication than the need to adapt materials to the background and abilities of the readers. And there is probably no more widespread documentation practice than to ignore the needs of users for the sake of convenience, efficiency or economy.

To reduce their costs and burdens, documentors typically create a single encyclopedic reference manual, in which every item of information appears exactly once. To make their work "easier," they may also put all the reports and exhibits in the back or number the pages with a cryptic code.

Usually, these and other practices that make life cheap and easy for the documentor also intimidate and frustrate the user. The burdens are on the readers, who, increasingly, are novice operators unable to find what they need.

Accessible Documentation

For documentation to be useful and accessible, however, it must be redundant and inefficient. The "same" instruction or procedure must be presented several ways in various versions, each tailored to a group of users. There must be different packages, different figures, even different levels of reading difficulty.

Law 2: All Manuals Are Out of Date, the Instant They Are Published.

Every system, device and program is changing (or at least being fixed). The more complex the product, the greater the rate of change. As a result, writing user documentation sometimes feels like changing a flat tire on a moving car.

Further, all manuals contain errors or "bugs." As in programs, the bugs in manuals begin to reveal themselves a few weeks after publication. Also, as in programs, trying to correct the bugs in manuals often creates new bugs — in places you never guessed.

Documentors need not ask: How can I prepare a current and accurate users manual? Rather, they must ask: How out-of-date and inaccurate will I let my users manual be?

Law 3: All Distribution Lists Are Inaccurate.

It is simply impossible to have a perfect record of everyone who owns a copy of a particular manual or reference guide (or of everyone who bought a certain product and should therefore receive the appropriate manual).

An interesting paradox: the more "efficient" your documentation (that is, the more convenient for the documentor), the more unauthorized and alternate versions will be generated by the users.

Law 4: Every Supplement to a Document Doubles the Number of Versions in Print.

When you have issued one version of a particular guide ("0"), there is exactly one version in circulation. (Let's ignore those unauthorized versions created by the users.) Now, when supplement #1 comes along, there are two versions; some users have only "0" and some have 0 plus 1. When the second supplement appears, there are four versions in circulation: 0, 0+1, 0+2, and 0+1+2. After three supplements there are eight versions. The proliferation is astonishing.

Law 5: Good Documentation Cannot Improve a Poor System.

If a system is clear, easy-to-use, maintainable and modifiable, then good documentation will show it. But if the system is inefficient, poorly designed and generally unfriendly to the users, good documentation will show that also.

Let me be clear. User documentation should clarify and simplify. But it cannot clarify what is unclear or simplify what is complicated and awkward to begin with. Although bad manuals can make systems worse than they are, good manuals cannot make them better.

Interesting Failure

The most interesting failure to appreciate this law is the case of several new "maintenance packages," designed to spare programmers the annoying task of writing design documents. These packages read a plateful of spaghetti Cobol and infer a "structure diagram" after the fact.

But, as Yourdon and others have told us repeatedly, you cannot make a program reliable and maintainable unless you design it that way. Pretty structure diagrams, inputed after the fact, cannot possibly ease the maintenance of an unmaintainable program.

In sum, good documentation makes a system or product no harder to use than it has to be.

The best systems and standards of documentation can ameliorate the effects of these laws and keep their disruptive consequences under control.

Documentor, resign yourself.

Weiss is a Ph.D. and consultant based in Cherry Hill, N.J.

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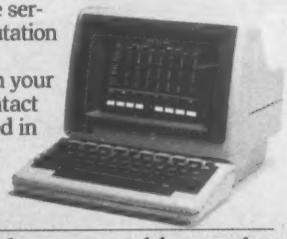

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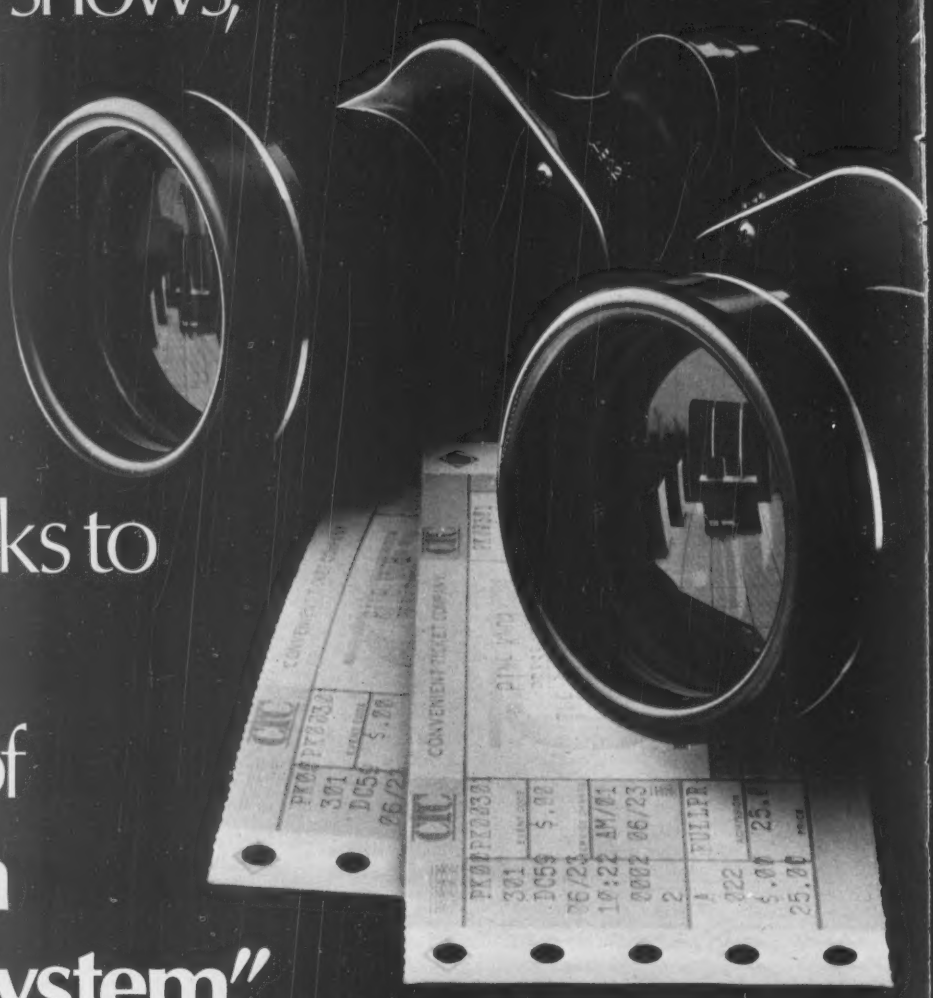

Marc Roland, President.
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TANDEM
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LETTERS

Applauds 'In Depth'

I just finished Gary Rosensteel's In Depth ["Why Systems Analysis Training Fails," CW, Nov. 16] and thought that it was great. It was also pointed and true in many cases.

I was surprised by survey rankings by the systems analysis group, but only because my own would have coincided with the user (or client, as I prefer), group. However, this may be because I work in a small DP shop (two programmer analysts, including myself), and we work closely with the people who want to use the facilities (not DPs, the company's).

I have worked at four companies in the last eight years as a programmer analyst. Only the first one and my current employer offered the kind of training and involvement that Rosensteel mentioned.

In addition, they both offered very positive feedback to me about how well I was doing my job and ways in which I could improve. Both have a high degree of client involvement in their systems analysis and development; the client runs the system, not the other way around.

All of this is to say that communications skills (especially listening) are, indeed, important. I do not always succeed, but reading articles like this one reinforces my determination to do better.

I went through an approach similar to the apprenticeship method mentioned in the article. It wasn't exactly the same, but there was someone with experience and patience to lead me (and three other novices) and to correct errors (mechanical and judgmental).

Jerry C. Adams
DP Manager
Burn Construction Co., Inc.
Las Cruces, N.M.

Three Cheers for 'In Depth'

Three loud cheers for "Why Systems Analysis Training Fails." After 25 years as a "systems analyst," I offer the simple definition of systems analysis as "people work."

By the very nature of systems analyst's work, of defining the basic elements of a system and perhaps restructuring the system so that it operates with more effectiveness toward a common goal, people are threatened. To make matters worse, most systems analysts I've known talk their own jargon or "computerize" while attempting to interview users. I agree 100% with Kenneth Zelman's letter to the editor [CW, Nov. 16] that he is "constantly amazed at the total lack of either knowledge and/or concern by all levels of personnel into making systems that actually work."

The world of management has made, and continues to compound, the error of promoting well-qualified programmers to systems analysts. The Peter Principle is very much alive and well. The position ads in *Computerworld* are consistent in that systems analysts are overwhelmingly defined as being highly qualified technologists — those who work with machines. This "head in the sand" philosophy of management will accomplish only one goal, increasing the number of man-centuries of DP work to be done.

Qualities I look for in a systems analyst are (1) liking people (2) ability to listen (3) ability to communicate (writing and speaking) and (4) ability to do research. While there may be systems analysts who are successful who do not like people (although I've never met one), I don't want or need them. I would rather work with a novice to systems analysis who sincerely likes people — for the other qualities can be taught. Keep up the good fight Gary Rosensteel, I wish you well.

Burt Parsons
Cedar Falls, Iowa

Do Programmers Need To Communicate in English?

(Continued from Page 53)

ital letters, along with paragraph structure and perfectly crossed t's are irrelevant if not necessary.

While the majority of people stop counting single digits at nine, some of us continue with "alpha," "baker" and "charlie." Sounds funny to those who don't understand, but to the computer it's the only way. For those of us who communicate with these complicated machines, it has become a way of life. We count differently and think differently. As a result, we communicate differently.

Granted there is a communications gap, but a good analyst can bridge that gap. Let the concern lie in developing and training analysts and translators proficient in both English and computer languages.

If a 12-year-old child can create an advanced stock market analysis program but cannot explain in English how it works, don't condemn or punish him. Even worse, don't cancel his "summer camp" in lieu of a summer school course in English. He is our future — part of the new highly technical breed. There will be those who *can* communicate with him and translators to bridge the communications gap — but to stop him, this will only stifle his growth . . . and ours.

Kostosky is employed as a programmer for Berwind Railway Service Co.

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CICS/VS Testing & Debugging • Use program dump to diagnose abends • Apply Trace, Dump and EDF facilities • Testing techniques for CICS/VS environment • Program testing and debugging workshop	CICS03	18-21	22-25
CICS/VS System Design • Design systems that utilize CICS/VS facilities effectively • Use program, file, terminal and data management services • Format screens using BMS and 3270 IDS facilities.	CICS04	11-14	8-11
DMS/CICS/VS Design and Programming • Generate on-line applications • Utilize supervisor and system functions • Code calculation, edit, control routines • Apply panel hierarchy techniques	DMS01	18-21	16-19
DATA MANAGEMENT			
VSAM Coding for Higher Level Languages • Process VSAM files effectively via COBOL or PL/1 application programs • Load, read, update and extend key or entry-sequenced datasets • Use alternate index to process VSAM file	VSAM01	4-6	8-10
VSAM Using Access Method Services (AMS) • Design and implement VSAM file structures • Use AMS commands to manage VSAM catalogs, data space, datasets • Create and use alternate indexes • VSAM recovery procedures	VSAM02	25-29	22-26
DATA BASE TECHNOLOGY			
DL/1 Applications Programming • Logical/Physical data base structures • Code DL/I calls to retrieve, update, add or delete segments • Build segment search arguments • Process status codes • Establish data base position	DL01	18-20	
IMS/VS Data Communications Programming • Describe IMS/VS message flow • Code DL/I calls to send and receive single or segmented messages • Design and code conversational programs • Use batch message processing facility	IMS02	21-22	
IMS/VS Data Base Design • Design data bases that effectively utilize IMS/VS facilities • Implement secondary indexing and logical relationships • Code and generate DBD's and PSB's • Define data base requirements	IMS04		1-5
PROGRAM & SYSTEM DEVELOPMENT			
DISTRIBUTED Processing Systems • Develop distributed system implementation plan • Describe distributed network components • Plan distributed data base management • Select applications for distributed processing	CS01	25-28	
ON-LINE Systems Design • Define on-line system requirements • Develop specifications and controls • Describe screen design procedures • Manage on-line files/data bases • Describe communication network components	SD02		17-19

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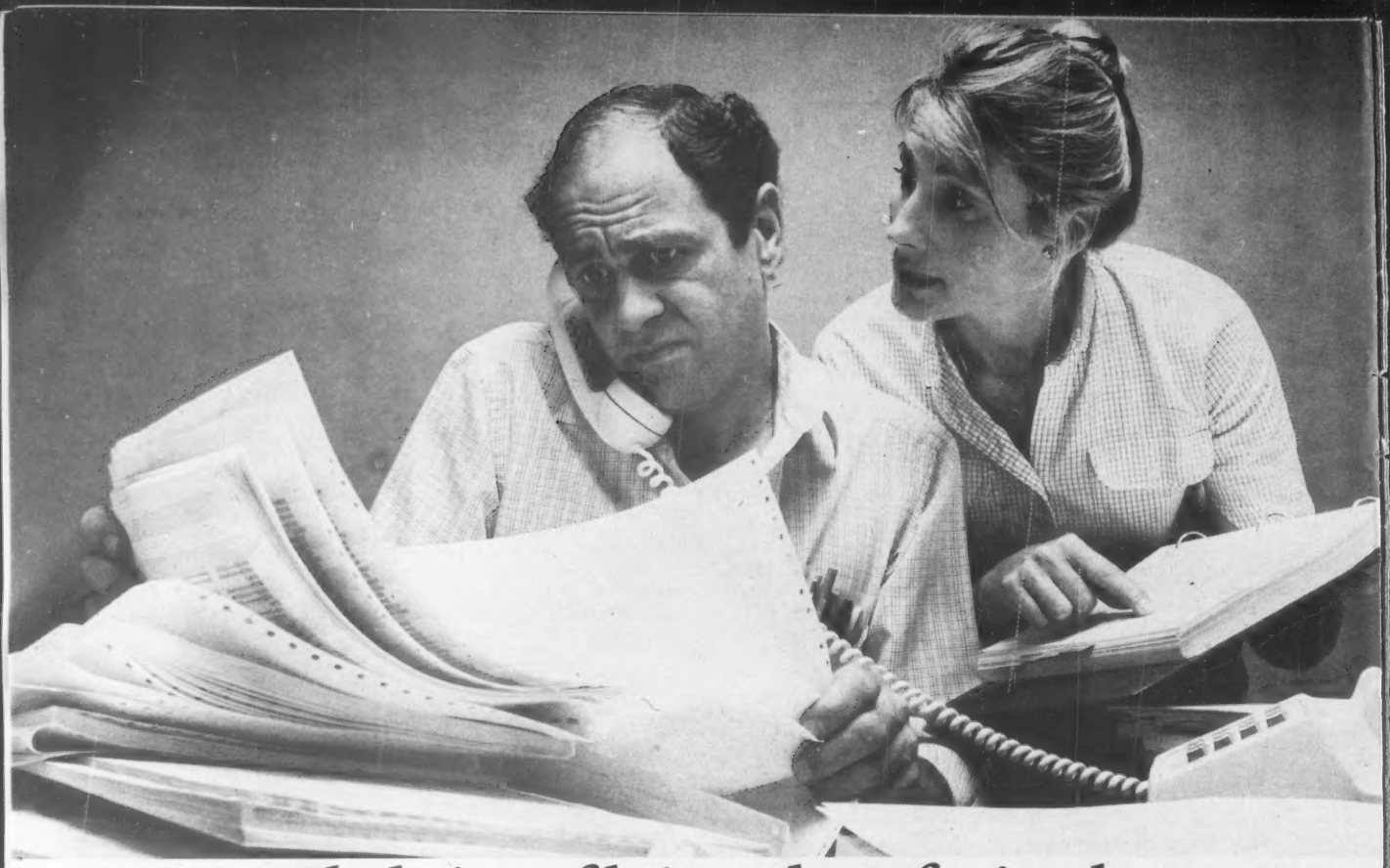

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Random Notes

English Report Generator Runs On Prime, Honeywell Systems

TULSA, Okla. — Datamate Co. announced the release of its English language report generator for Prime Computer, Inc.'s 50 series running under Primos and for Honeywell, Inc. systems running under the CP-6 operating system.

Datamate is described as a free-format, end-user query facility that allows users to create their own reports without being concerned about data type, formatting or presentation. Datamate reportedly creates a report from user specifications.

Datamate is priced at $9,500. The vendor is located at Suite 101, 4135 S. 100 E. Ave., P.O. Box 4159, Tulsa, Okla. 74104.

Genesys 'Human Resource' Gains Personnel Software

LAWRENCE, Mass. — Genesys Software Systems, Inc. is offering personnel software that integrates instant access to all employee data and fits with the vendor's current Human Resource software package.

Allscreen provides human resource managers with direct access to all personnel and payroll information. It also offers unlimited screen capabilties to enter and obtain data in any format. The system can use English, French or other languages, the vendor said.

The package is priced at $24,000, Genesys said from 10 Grafton St., Lawrence, Mass. 01843.

Fuel Distribution System Offered for U.S.-Based Firms

DENVER — Gathers Software, Inc. has announced a Fuel Distribution system for U.S.-based fuel distribution firms.

The on-line interactive data base system monitors fuel allocation, gallons captured at gross and temperature, state tax reporting, inventory control on either a Lifo or Fifo basis, gross profit analysis and automatic inquiry of monthly distribution.

The package costs between $30,000 and $60,000 depending on the company size, the firm said from 3888 E. 45th St., Denver, Colo. 80216.

SPSS Business Graphics Option Available on Prime Systems

CHICAGO — SPSS, Inc., a developer of data analysis software, has announced that its business graphics option is now available on Prime Computer, Inc. equipment.

Developed jointly by SPSS and Issco, Inc., the graphics option is said to allow the user to produce pie charts, bar charts and a variety of line charts, all of which reportedly can be made with 15 different shading patterns and up to six colors.

The option carries an $8,000 initial annual license fee, with a $4,000 price tag for second-year renewal. Discounts are available, a spokesman said from 444 N. Michigan Ave., Chicago, Ill. 60611.

Software Helps Teach Accounting on System/23, 34

JACKSON, Minn. — A general ledger accounting software system designed for schools that teach computerized accounting has been announced by Team Custom Software, Inc.

The Accounting Instruction System is said to operate on the IBM System/23. The system is also available on the System/34, using Basic Release 7.0.

A license for the Accounting Instruction System costs $550; demonstration diskettes are available from Team at 608 2nd St., Jackson, Minn. 56143.

Micro Development Tools Hit as 'Utterly Inadequate'

ANAHEIM, Calif. — Current microcomputer software development tools are "utterly inadequate for serious DP software development," according to consultant David Ferris, who addressed a recent conference session here on micro software trends in the business and professional environment.

Most data base management systems (DBMS) for personal computers are "little more than elementary Isam file organizations, with no real understanding of such major issues for the software professional as relatability and multiuser concurrent access," Ferris continued.

He further contended that development utilities associated with micro DBMS — such as query systems, report writers, screen formatters and data dictionaries — are still at a rudimentary stage, lacking many facilities needed by programmers trying to build an integrated set of quality application programs.

Some of the reasons Ferris cited were limited edit masks and validation criteria for screen definition and "a surprising inappreciation of the central role data dictionaries should play."

He praised micro development tools for their ease of use compared to their mainframe counterparts. According to Ferris, most IBM systems and utility software, with the possible exception of VM/CMS products, have much to learn from the micro world where development tools were designed to be interactive from the ground up.

DP managers most likely will resist the infiltration of personal computers into their domain, he said, but eventually will be forced to accept the micro invasion. A major reason is that end-user departments that are employing personal computers to run stand-alone applications such as electronic spread sheets or word processing are demanding access to DP-developed applications and the corporate data base. DP has to be involved here, for example, to install wiring or modems or to grant log-on privileges.

Ferris noted that IBM's Personal Computer also will ease micro acceptance among DP staff members.

The micro community appears to hold the belief that mainframe DP departments are incompetent because of long response times and high costs associated with new application development in that environment, he explained. However, these problems are moving into the micro world.

"Most of the micros destined for the business environment will end up spending a lot of time on traditional applications such as order entry, inventory maintenance, accounts receivable and so on . . . The facts are that as people attempt to build an integrated portfolio of programs around a central data base, life suddenly gets much, much harder and this applies in exactly the same way whether you have a $4 million IBM 3081 mainframe or a $1,000 TRS-80," Ferris said.

The Data Base Concept — Part 2

Difference Between Traditional, Data Base Systems Seen Crucial

By Glenn Whittington
Special to CW

The distinction between traditional application systems and data base systems is a crucial one.

Traditional systems were designed to store and process information for individual managers or departments, not the company as a whole. The input, storage and processing needs were geared as a whole to specific, limited and predetermined output needs.

In contrast, data base systems development should reflect recognition of an environment organized around the concept of a data input system, an information output system and a data storage and processing system.

Perhaps the most significant difference between the traditional systems environment and the data base systems environment is the need for information systems managers to think in terms of company objectives rather than limiting their view to department objectives when designing application systems. The data base must be built for the entire company rather than for individual managers or departments.

Company management should be brought into the data base planning process by identifying the information it needs to manage the corporation. Technically oriented DP staffers often lack the basic understanding of "how" the company really does its business.

Input responsibilities, output needs and storage and processing capabilities must be examined separately. And the DP group should examine its own commitment and direction relative to the data base environment.

DP should prepare itself to take a leading role in influencing the uses of the corporate data. It must recognize that positive control is essential to the successful operation of a data base/data communications environment.

This is Part 2 of a three-part series that Whittington developed from a slide presentation he has given to DP organizations over the last year and a half. In this week's article, he further details the differences between application and data base systems. Next week, he explains how an organization actually develops a "data base environment."

There are four elements that are key to the success of such an effort. Without a firm management commitment and the necessary training, your progress will be slow and painful, if successful at all.

Without training and the continual reinforcement by management of its commitment to achieve a data base environment, the programmers and analysts will too quickly revert to their old way of doing things.

Management must define the functions

(Continued on Page 60)

Written in Fortran

Graphics Package Runs on VAX-11s

OLD LYME, Conn. — Qtech Associates has introduced a graphics package called Qplot for use on Digital Equipment Corp. VAX-11 systems.

Written in Fortran, Qplot can plot on virtually any graphics device that can draw a vector, Qtech said. A user needs to learn only one graphics "language" and, by varying a single parameter, may direct output to many different graphics devices.

Moreover, Qplot can also output to an intermediate plot file (IPF) during applications program execution. The IPF may then be redirected to one or more graphics devices using the post-processor Qpost without having to re-execute the applications program, the vendor said.

Qplot provides routines for two-dimensional rectangular and polar plotting, three-dimensional rectangular plotting with hidden line removal, flow charting, mapping and typesetting.

Ease of Use

Ease of use was stressed, according to Qtech. The system is modular and highly structured with consistent routine argument naming conventions.

All system- and device-dependent code for Qplot has been isolated. This means the system can be adapted to changing requirements and graphics devices, according to the vendor.

Accompanying Qplot are several auxiliary programs. Qsim is a simulation library for California Computer Products, Inc. routines. An existing Calcomp applications program can reportedly use Qsim as an interface to Qplot to achieve device independence.

The price for Qplot and auxiliary programs is $3,000 and is a one-time charge for a single-CPU proprietary license.

The firm charges an annual maintenance fee of $500 and for $25 provides a Qplot reference manual. The vendor can be reached through P.O. Box 952, Old Lyme, Conn. 06371.

'Graphix-11' Fits PDP-11, LSI-11

PHILADELPHIA — Geographix, Inc. has announced Graphix-11, a graphics package for Digital Equipment Corp. PDP-11 and LSI-11 users.

Designed for DEC's RT-11 operating system, the package features 25 different printing patterns for bar charts, a menu-driven format and a variable scale, the vendor said.

The package costs $1,095, Geographix said from 156 N. Third St., Philadelphia, Pa. 19106.

Difference Seen Crucial

(Continued from Page 59)

of the data base environment and assign specific responsibilities for those functions. Management must take an active and positive role in defining the environment before the technicians are set to the task of functionally implementing the environment.

Management involvement and understanding is especially critical to the most significant change that must be made. With the introduction of the concept of the data base environment, the basic concept of DP itself changed.

The concept of the data base environment is based on the principal of corporatewide use and control of data. This is as opposed to the traditional view that held that computer systems were designed for, and were the special province of, individual departments.

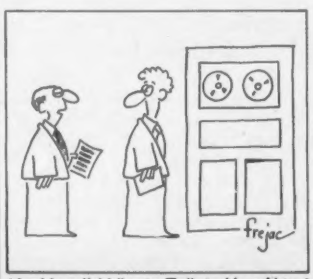
The change from the traditional design approach to the data base environment design approach is a psychological change more than it is a technical change.

This is why the technicians, without management direction and support, cannot alone effect the move from the traditional environment to the data base environment.

Because it is a drastic psychological change, management must continually reinforce its commitment to the change or the technicians will too easily revert to the old comfortable ways.

If management allows them to revert to traditional approaches in even the slightest ways, the benefits that can be derived from the data base environment will not be totally obtained.

Whittington is the manager of data administration for Mostek Corp.



'Jenkins, I'd Like to Talk to You About This Program of Yours Entitled "Accounts Pocketed."'

"Over a period of two years, we looked at almost every security package on the market. And we chose TOP SECRET™."

Larry Dempsey, Supervisor, Systems Software, USAir.

"Over the past two years, we looked at several of the major security packages and have decided on TOP SECRET from CGA/Allen.

"CGA/Allen claimed TOP SECRET would be easy to install and would not require any operating system modifications, they were right on both statements. The product was installed within ten minutes. We installed it on MVS/SP1 without having to modify any part of our operating system.

"In relocating USAir's entire data center to a newly constructed facility , we had frozen all new system software implementations. We were confident that TOP SECRET was stable and independent enough for our operating systems that we felt comfortable in making an exception to our freeze. During a period of potential system unstability because of a move, installing a security package is saying a lot for the package.

"We are implementing security gradually — it might take as long as a year. We are confident that it will go smoothly with TOP SECRET. It is a very straightforward system and has facilities to secure our entire MVS/IMS/TSO operations. In our opinion, TOP SECRET is the best package on the market."

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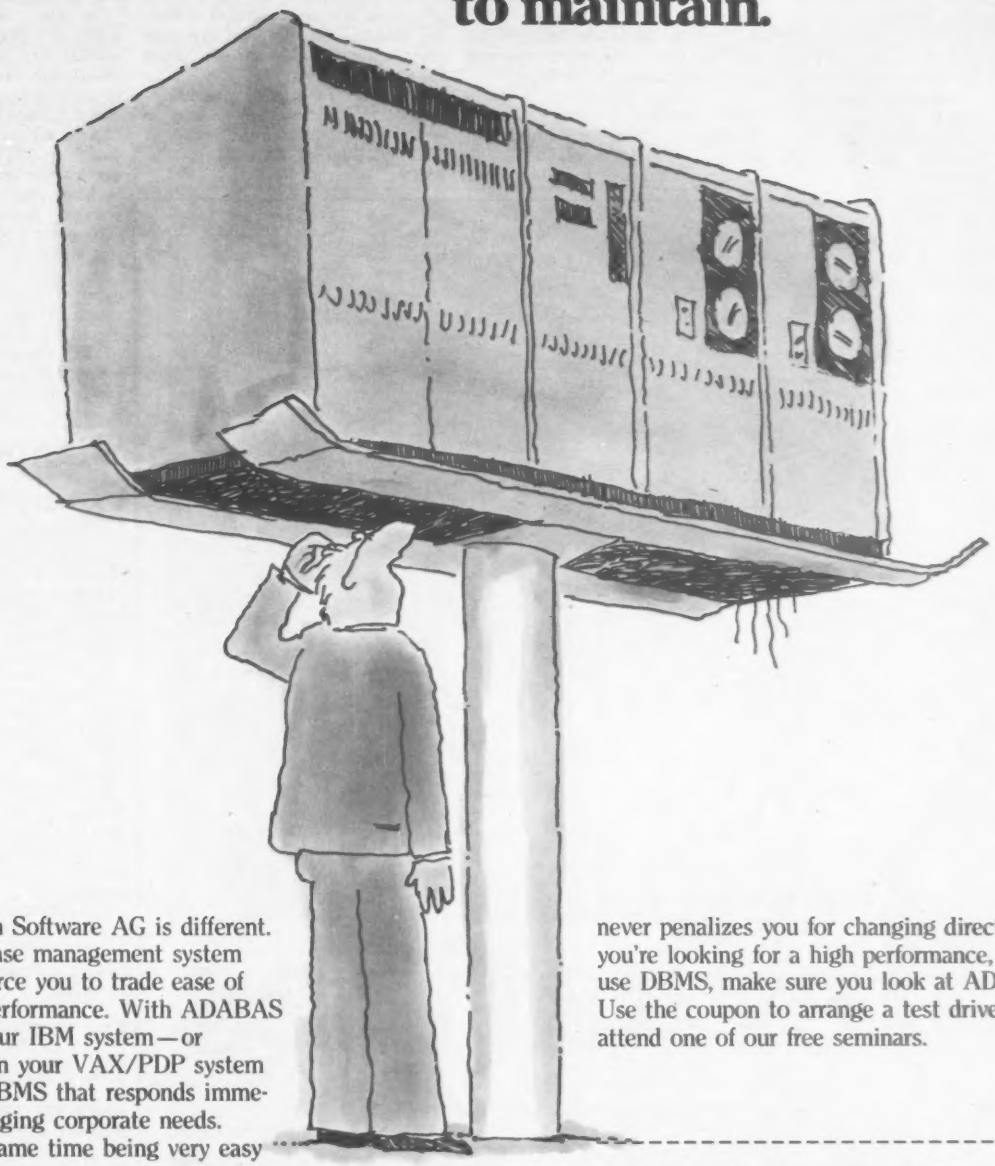
Some data base management systems are like sports cars.

Hard to start and expensive to maintain.



ADABAS from Software AG is different. It's the data base management system that doesn't force you to trade ease of use for high performance. With ADABAS installed on your IBM system—or ADABAS-M on your VAX/PDP system—you get a DBMS that responds immediately to changing corporate needs. While at the same time being very easy to handle.

Starting is never a problem with ADABAS. The system can be installed and ready to load files in less than a day. Driving ADABAS takes no special skills. Four days of training is all that's needed to have your existing staff running production. You'll never get lost if you make a wrong turn with ADABAS.

Unlike some DBMS that resist change because of their chain pointer architectures, ADABAS is a relational-like system that never penalizes you for changing direction. If you're looking for a high performance, easy to use DBMS, make sure you look at ADABAS. Use the coupon to arrange a test drive, or to attend one of our free seminars.

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CW1207

Screen Editor for DG Units Updated

DAVIS, Calif. — Micro Metric announced here Revision 1.20 of its full-screen editor, Coed, which runs under Data General Corp.'s RDOS, AOS and MP/OS operating systems.

Coed is said to allow functions including variable tab stops, macro definition and execution, global repeat, pattern search, replace, confirm, block move, copy and delete. In text mode, it allows auto-wraparound, variable margins and paragraph reformatting.

Special features of revision 1.20 reportedly include increased execution speed, block input and output files, repeat with block and line move functions, variable status display information, number register and arithmetic operations.

A single CPU license with one-year support for a single user of Coed is available for $750. A multiterminal version costs $1,000, according to the vendor located at No. 3B, 132 E. St., Davis, Calif. 95616.

'MRP II' Package Available In Cobol for Wang VS Users

MILWAUKEE — A closed-loop, real-time Manufacturing Resource Planning (MRP II) package written in Cobol for the Wang Laboratories, Inc. VS system was announced here by Manufacturing Systems, Inc.

The package reportedly includes bills of material, inventory control, materials requirements planning, capacity requirements planning, job costing, accounting and shop floor control. An interactive package that uses menus to link the applications programs into an integrated system, the software was designed to reduce installation and maintenance costs, the vendor said.

Including programs, procedures and documentation, the package is priced at $30,000 from the vendor at 3645 W. Elm St., Milwaukee, Wis. 53209.

Within the CICS environment, the need for a sort facility continually arises ■ Your end users want to be able to dynamically specify the sequence of output displays ■ Your application programmers want to do binary searches on out-of-sequence tables ■ Your systems programmers want VSAM records added in sequence for efficiency. The list is endless...

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Tool Manages Maintenance For Many Users

BELLINGHAM, Wash. — A maintenance management package designed for use in manufacturing, processing, utility and industrial plants; institutions, hospitals and schools; and maintenance and repair businesses was announced here by ABC Management Systems, Inc.

The ABC/MM Maintenance Management System is said to work equally well on a general-purpose mainframe, dedicated minicomputer or microcomputer or remote time-sharing basis.

There are reportedly an ABC/MM data base and eight modules including maintenance labor, work-order backlog, planning aids, work-order activity, monthly budget report, equipment history record, stores catalog and preventive maintenance.

ABC/MM is said to require 64K bytes of memory and is priced between $11,000 and $59,000, depending on the number of modules selected. Maintenance and enhancements are an additional 10% per year, the vendor said from Suite 3, 805 Dupont St., Bellingham, Wash. 98225.

'Planner' Out On System/34

NEW YORK — Planner, a software package designed for finished goods forecasting within mid-size manufacturing companies, was announced here by Ernst & Whinney for use on small business computers such as IBM's System/34.

Planner also is said to be compatible with many manufacturing control software packages including IBM's Manufacturing, Accounting and Product Information Control System.

The package is intended to forecast finished goods demand and provide data that helps management evaluate and coordinate sales, marketing and purchasing plans, according to the vendor.

Planner is licensed for a one-time fee of $7,500 or for 18 monthly payments of $450 each, the vendor said from 150 S. Wacker Drive, Chicago, Ill. 60606.

Datagraph Offers Graphics Package

ARNOLD, Calif. — Menu-driven software designed to allow the creation of charts and graphs on Diablo protocol daisywheel printers is available from Datagraph, Inc.

Using Accuchart Release 1.2, the operator reportedly enters only the desired chart type and size, data values, titles and labels. The software then performs all calculations and generates the chart, according to the firm.

The program requires a disk drive with 225K bytes of storage and 48K bytes of random-access memory. Accuchart will reportedly function on any Z80, Z8080 or Z8085 machine using Digital Research, Inc.'s CP/M Version 2 operating system. Accuchart costs $295 from the firm at Drawer Drive, Arnold, Calif. 95223.

Multibank Deposit System Runs on IBM OS, DOS

DALLAS — The Combined Deposit System, a software package that reportedly will include support for multibank and multibranch operations using IBM's Vsam or University Computing Co.'s (UCC) Data Base System running under IBM's OS and DOS operating systems, was announced here by Pacesetter Systems, Inc.

The package also will employ IBM's CICS and UCC's Data Communication System for on-line support, according to the vendor.

The banks using the Combined Deposit System will have the optional use of features supporting checking and savings accounts such as on-line data entry, overdraft/credit reserve support, zero-balance accounting using a concentration account concept, bank-unique service charge and interest calculation methods and customer analysis statements, the vendor said.

The Combined Deposit System will be available for general release and use by mid-1982. Its license fee is $80,000, the vendor said from Suite 1053, 2828 Forest Lane, Dallas, Texas 75234.

System Converts Tabular Figures To Charts

SPRINGFIELD, Ill. — A financial graphics system that is said to allow the conversion of traditional tabular financial statements, schedules and reports to standardized graphics charts has been introduced by Irwin M. Jarett, CPA, Ltd.

Called Fingraph, the system, which includes software written in Dibol, utilizes Regis graphics commands and uses a Digital Equipment Corp. VT125 graphics CRT terminal or Gigi system, according to Jarett. It can operate with either of DEC's CTS 300 or CTS 500 (RSTS/E) operating systems and can tie to existing data bases or operate stand-alone, Jarett added.

Fingraph also creates an international financial icon that creates financial graphics representation understandable throughout the world, Jarett stated.

Fingraph software sells for $9,750 for the first CPU and includes documentation and training. More information can be obtained by contacting Irwin M. Jarett, CPA, Ltd., Suite G, 960 Clock Tower Drive, Springfield, Ill. 62704.

Conversion Utility Allows Micros IBM Systems to Share Information

OAKLAND, Calif. — A conversion utility that allows information sharing activity between IBM systems and popular microcomputers is available from Phase One Systems, Inc.

The IBM 3471 Basic Exchange option to the Oasis operating system can read and write IBM 3471-formatted diskettes on any 8-in. single-density floppy disk system, the vendor said.

Compatibility features include bidirectional data transfer, full directory manipulation and Ascii/Ebcdic conversion to enhance the IBM/Oasis transfer. Any diskette developed by either system is said to be quickly available for use to increase the flow through information channels.

The Basic Exchange option costs $250, Phase One said from Suite 830, 7700 Edgewater Drive, Oakland, Calif. 94621.

TSI 'Key/Master' Gets Enhancement

NORWALK, Conn. — TSI International has announced a new release of its Key/Master on-line data entry system for IBM's CICS.

Release 2.2.5 is said to feature hard-copy output, increased supervisory control functions and additional field edits.

Key/Master costs $595/mo for DOS and $650/mo for OS from 50 Washington St., Norwalk, Conn. 06854.

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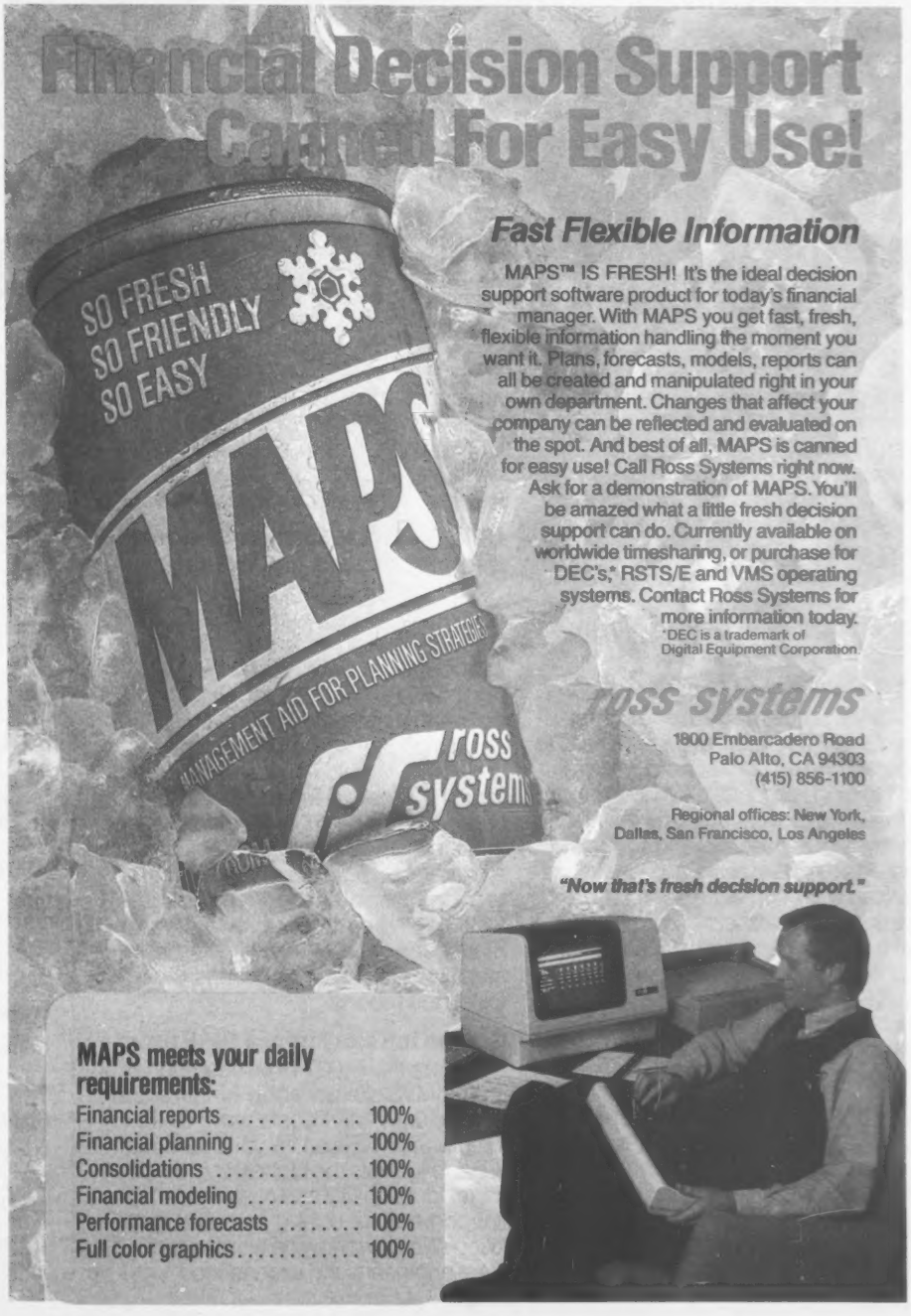

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For fine-tuning MVS operations including IMS, CICS, or TSO, nothing captures the total systems view like CMF (Comprehensive Management Facility). CMF provides historical and realtime MVS control, performance evaluation, and capacity planning, plus three new features: SHIFT, TRACE, and IPS graphics. Nobody but Boole & Babbage makes MVS management this comprehensive and simple.

MVS problems will cost you plenty

MVS problems get more complex as your DP operation grows. It's hard to evaluate and adjust a system while still maintaining reasonable service levels. Without the tools to properly maintain a system balance, costly (and potentially unnecessary) hardware add-ons become common last resorts. CMF can give you the necessary information to make cost vs. performance decisions for your operation. Specifically, in vital areas like real vs. virtual storage, CMF helps you achieve the optimum configuration to properly balance your systems workload.

CMF gives you the biggest picture

CMF's in-depth realtime displays show recent activity compared to historical trends, plus additional reports on machine status, service time, and CPU utilization. This gives the systems programmer immediate access to important data without scanning voluminous batch reports. When invoked, CMF gathers and analyzes statistics, generates reports, and provides tuning information, all with minimal overhead.

CMF optimizes storage, captures data and displays the results

For more efficient organization of your disk storage, CMF uses DSO (Data Set Optimizer) to determine where related data sets are located on DASD, and make specific recommendations for optimum placement. DSO even calculates percentage improvements for you. CMF has two new commands. The SHIFT command gathers data according to selectable time increments, and the TRACE command captures extra detailed systems information and provides user interface support. And CMF has five color graphic displays for management reporting, with Kiviat, tabular, bar, IPS and pie graphs, plus exception reports.

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Package Analyzes Investment Tax Credits

NEW YORK — Corporate Time-Sharing Services, Inc. has developed software for calculating possible buying/selling transactions of investment tax credits (ITC) made possible by the Economic Recovery Tax Act of 1981.

Available on the Dartmouth Time-Sharing System (DTSS), the package, according to the developer, produces the following reports: analysis of buyer's and seller's tax returns, summary of buyer's reinvestment cash flows, analysis of buyer's cash flow for ITC investment and allocation of income on ITC investment.

Also generated are reports on allocation of buyer's cash flows to investment and income, components of buyer's book income and computation of deferred taxes, according to the vendor. The system is said to allow the user to change input parameters instantly for analyses of possible transactions.

The software is available on an as-used basis through DTSS, a spokesman said from 30 Rockefeller Plaza, New York, N.Y. 10112.

Multiuser Cobol System Adapted For TI Business System 200

ROUND ROCK, Texas — Ryan-McFarland, Inc. has announced that its COS990 Multiuser Cobol System is available on the recently announced Texas Instruments, Inc. Business System 200 computer.

COS990 on the Business System 200 will reportedly be equivalent to the COS990 available on TI's models 771 through 30. Any existing COS990 application can be moved to the new hardware without change, according to the vendor. In addition, all data and program file formats are said to be completely interchangeable.

COS990 features a job description language that provides for synonym substitution, parameter passing, conditional execution, batch streams and user-access control.

Sublicense fees for end users start at $300, including the operating system without a compiler to run applications. A primary license fee for OEMs or large end users is $3,500, including Cobol compiler and support, a spokesman said from 2111 N. Mays, Round Rock, Texas 78664.

System/34 Users Get File Layout Offering

LUDLOW, Mass. — Computer Technologies, Inc. has announced a utility for IBM System/34 users.

Layout is said to assist the user in verifying file layouts for a user library. The printout is said to show a file only once even though it is used in several different programs; each unique field utilization is listed below the file name in physical sequence. Layout carries the option of six or eight line/in.

Same-day service is available for $95 and a diskette, through P.O. Box 259, Ludlow, Mass. 01056, Computer Technologies said.

System/34 Gains Financial Tool

MILL VALLEY, Calif. — Fusion Products, Inc. has announced FPI/3, a financial modeling package for IBM's System/34.

The menu-driven package offers more than 50 functions and can process models that have up to 96 columns with 997 lines each.

It was designed for the inexperienced user with detailed "help" screens and a file maintenance feature that does not require programming experience, according to a vendor spokesman.

FPI/3 costs $1,500 for a one-time fee, Fusion Products said from 317 Miller Ave., Mill Valley, Calif. 94941.

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"HAMILTON certainly has a comprehensive rental program."

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LONDON PARIS DÜSSELDORF CALGARY

System/34 Gets Search Package

SAN FRANCISCO — The Document Retrieval System for the IBM System/34 uses pattern matching and evaluation of expressions, according to the package's vendor, Computer Software Associates.

The package is said to allow a very general search request, with logical operators and parentheses. For example, a command could specify, "LOOK FOR ACCIDENT OR INJURY, BUT NOT INDUSTRIAL." The software would, therefore, exclude industrial accidents from the search.

The Document Retrieval System is priced at $3,000 and is available from Computer Software Associates, 140 Belvedere St., San Francisco, Calif. 94117.

System/34 Gains Accounting Tools

ROCKPORT, Mass. — Four accounting packages for IBM System/34 users were introduced here by Para Research, Inc.

The packages are general ledger, payroll, accounts payable and fixed assets, the vendor said, noting that every program can update information to the general ledger package. The software is said to produce trial balances, balance sheets summary and detailed income statements. Reports include individual, consolidated and comparative year transactions.

Each package is priced at $500, the vendor said from Whistlestop Mall, Rockport, Mass. 01966.

Calculating Aid Fits System/34

WALTHAM, Mass. — A software package that reportedly aids IBM System/34 users in performing routine financial calculations has been introduced by Mass Systems Co.

The MSI Financial Desk Calculator is said to permit use of an IBM System/34 in an interactive mode to solve problems involving financial formulas without referral to handbooks and tables. Supplied on diskette, it handles simple and compound interest, loan/mortgage amortization, present value and bond yield and pricing, its vendor said.

The package is priced at $250 from Mass Systems, 28 Edgehill Road, Waltham, Mass. 02154.

Directory Details Software Choices For System/34

NEW YORK — A directory said to contain more than 300 descriptions of software packages for the IBM System/34 has been announced by Pac-Finder System/34, a division of Mincron SBC Corp.

Each Pac-Finder entry is said to include the vendor, title, source language, pricing options, number of installations, purpose, functions and features of a software package.

The directory is arranged by major area of application in a tab format. Packages are cross-indexed and range from general ledger and payroll to small business financial planning and forecasting.

Subscriptions to the Pac-Finder System/34 cost $295, including free quarterly supplements, user ratings and software inquiry service. The firm is located at Suite 2809, 350 Fifth Ave., New York, N.Y. 10118.

Inventory Tool Forecasts Sales

SANTA ANA, Calif. — Application Development Services, Inc. announced here a new Inventory Demand Forecasting package for use on the IBM System/34 designed to provide forecasting of sales for inventory items by vendor and to note recommended reorder points and reorder quantities.

The package is said to interface with inventory and sales order files. Forecasting is done using double exponential smoothing of prior sales demand and forecasts. "What-if" capabilities are provided to enable users to experiment with different forecasting scenarios.

Inventory Demand Forecasting is menu-driven and interactive where operator input and output are required, the vendor said. The software is written in RPG II and has a one-time license fee of $1,500, the vendor said from 1700 E. Dyer Road, No. 214, Santa Ana, Calif. 92705.

Datamaster Gets Dental Turnkey

SPRING HOUSE, Pa. — Whelan Associates, Inc. announced a turnkey version of its Dentalab package based on IBM's System/23 Datamaster that was designed for the medium-size dental laboratory.

The package reportedly is targeted toward dental laboratories with gross sales greater than $250,000 per year. It includes order entry, work tickets, case location, product group analysis, customer sales analysis, automatic pricing, invoicing, accounts receivable and balance forward statements.

It is said to incorporate a menu-driven approach and to encompass on-line order entry with scheduling of cases through each laboratory department.

Including the IBM equipment, Dentalab is priced around $18,000, the vendor said from Gwynedd Plaza, A/E Center, P.O. Box 540, Spring House, Pa. 19477.

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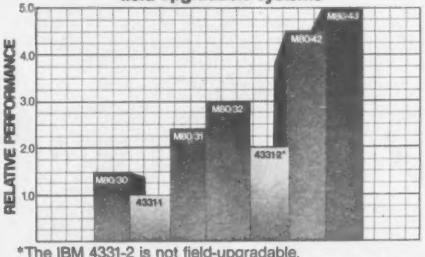

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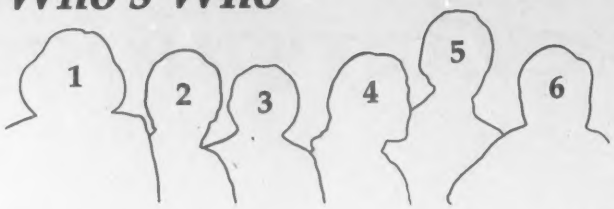
Who's Who



1 *Ruth Covell, who conducted this interview, has been director of marketing for Auerbach, Inc., Pennsauken, N.J., for the past two years. She was previously the owner of a consulting company specializing in public relations and advertising for consumer markets and an editor of* Redbook *magazine. Covell has a B.S. in chemistry from Cornell University and an MBA in finance from The Wharton School, University of Pennsylvania.*

2 *Dr. James H. Carlisle is a respected innovator and educator in the electronic office field. He is president of Office of the Future, Inc. in Gutenberg, N.J., the first management consulting firm specializing in office automation design and implementation. Carlisle has been involved in the development, implementation and evaluation of office automation systems for a number of clients, including the Rand Corp., Fiat Automotive and Chase Manhattan Bank.*

3 *Frank Brignoli currently manages the development of office systems for the Air Line Pilots Association International (Alpa). He was previously a member of the Office of Administration, a unit of the Executive Office of the President, where he managed the Office Automation Facilities Branch. While with the Naval Ship Research and Development Center (1968-1976), he was involved in the areas of computer networking, office automation and computer security. He is an adjunct associate professor at the New York Institute of Technology and has been an instructor for the University College, University of Maryland. He holds a B.S. in mathematics and an M.S. in computer science. He is an officer of the IEEE Computer Society (Washington, D.C., chapter) and a member of the International Word Processing Society and the American Association for the Advancement of Science.*

4 *Caroline M. Watteeuw is vice-president and a member of the Executive Committee of Office of the Future, Inc. She has had responsibility for the development and direction of the firm's international network of consulting associates. Watteeuw has served as consultant to a number of leading companies, including Digital Equipment Corp., Associated Biochemical Engineers and Consultants and Siemens.*

5 *Jim Hannan is managing editor of the Auerbach Information Management Series, a group of 10 stand-alone information services designed to address the management needs of DP professionals. Prior to joining Auerbach, Hannan taught at the University of Pennsylvania, where he was engaged in a computer-assisted research study for his doctoral dissertation. He holds an M.A. from the University of Pennsylvania and a B.A. from Seton Hall University.*

6 *Janice Wright has been a project editor for three volumes of the Auerbach Computer Technology Reports. She played a key role in developing Auerbach's office automation information service, Electronic Office — Management & Technology. Her areas of expertise include word processing and office communications systems as well as automation software for mini- and microcomputers. She was previously a member of the Business Development Group at Vydec, Inc., a subsidiary of Exxon Information Systems. Prior to joining Vydec, she was a communications consultant for New Jersey Bell Telephone Co. Wright has a B.A. degree from the University of Kentucky and an M.A. from Seton Hall University.*

Planning

A Round Table Discussion

Auerbach: The Information Company, publishers of the successful information service Electronic Office, *capped the anniversary of this publication by convening an expert round table. The members of the panel consisted of two of the publication's originators, Jim Hannan and Janice Wright; consulting editors Dr. James H. Carlisle and Caroline M. Watteeuw of Office of the Future, Inc.; and Frank Brignoli, adviser. Ruth Covell, Auerbach's director of product marketing, led the discussion, which was designed to explore emerging issues in office automation.*

What are the first steps in planning and implementing a successful office automation system?

Watteeuw: The term "planning" is much too generalized to apply to the initial steps. Strategic planning comes first and has nothing to do with technology. You have to first answer the questions, "Where is the company going? What goals do we agree on and how do we get there?" Until that's settled, technology is irrelevant.

Next comes organizational planning. You need answers to questions such as, "How do we prepare our people for change?" The third step focuses on implementation, starting with the feasibility study and a detailed start-up approach. It is at this level that you can look at the technology out there and see how it fits into your plans and overall corporate strategy.

Brignoli: After the initial steps are completed, I like to think through and identify some of the problem spots in the current office routines and procedures. Usually these can be found in the areas of text processing or communications. After the problems have been identified, you need some solid systems work to identify what's happening right now — what the bottlenecks

for Office Automation

are, what the cost is in people and time.

These studies help you identify your initial requirements; interviews and consultants are also helpful. The user needs should be measured against the goals of your strategic plan, goals that should be continually scrutinized. As you get into the problem, users become more informed, management continues to explore possibilities and, before you know it, the original goals are no longer being considered. Suddenly you say, "Wait a minute. That wasn't quite what we had in mind." Or somebody comes along and tells you that your plan doesn't match the original mandate.

Quite often the business picture changes during implementation, and management, without clearly articulating a new goal, imposes cost avoidance as the measure of performance. Meanwhile, you're happily working away bringing in the best technology to solve the user's problems — problems that have shifted with new business conditions.

Hannan: I think Frank and Caroline have both hit on some important aspects of this entire problem. I would like to expand on one of Frank's points — rethinking the way in which things are currently being done. Good systems procedures, user interviews and the like are often wasted effort if you fall victim to the technological imperative, an attitude that says, "Now that we have identified a user's felt requirements, let's throw a little technology at it and watch the problem sink under the weight of the technology." We all know that this kind of thinking has caused more problems in the world of data processing than almost any other. What I'm advocating is serious rethinking of the way in which things are being done and then applying technology to these systems solutions.

Brignoli: I agree. One of the sentences I like is, "Technology is only as effective as the users permit it to be."

One of the ways you can test for people's willingness to use technology is to let them experiment with it. This technique keeps you from rushing new and poorly understood technology into the production process, a move that always ends in disaster, no matter how effective your advance planning might be. Many companies bypass any deliberate experimentation; whether they know it or not, they go through it anyway when they go into full-scale use.

Often, management will take a look at their systems six to 12 months down the line — and find a big surprise. When they compare actual operational and systems procedures with what they planned, they discover that operational people have run into major problems and solved them with superior procedures. Though ultimately successful, the operational people have often limped along for months trying to implement a plan they knew was not going to work.

The experimental period happens, planned or not, so you might as well plan it and move into production with a lot more "smarts" about the way the technology, the process and the system interact and actually work together.

I would like to go back to something that Caroline said about "full-scale strategic planning." Are you advocating this process for both the large and the small computer?

Watteeuw: I think it's a very useful technique for any organization, regardless of size. If you don't have a strategic plan, there's no way you can plan intelligently how to implement and use technology. Remember, strategic plans aren't short-term — they're generally projected over at least five years. The strategic plan allows you to build a family of plans with short-term goals, which are more detailed, but which further your overall strategy.

Carlisle: I'd like to relate some of

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our previous comments to the common pitfalls we see in business planning. The first of these was identified as the "technological imperative." Organizational planners often start with, "What is available, and what can it do?"

When planners focus on technology, it dominates their planning. They make a long-range decision based on current technology and end up being locked out of exciting developments.

The second pitfall is to confuse decision making with strategic planning. Decision making, on one hand, is frequently accompanied by time pressures, incomplete information and other constraints. Strategic planning, on the other hand, should specify overall goals and contain checkpoints that guide your decision making. It should answer the question of whether you're ready (according to the strategic plan) to make a given decision.

A strategic plan requires more than knowing exactly where your company is or what its strong and weak points are. It demands that you understand the industry and the competition and that you delineate those factors crucial to continued growth and success.

The third pitfall is "amateur planning." It's clear that unless your management is trained in professional planning techniques, they will stumble into the first two pitfalls. Your operational managers are decision makers by temperament, training and experience. It's unlikely that they'll be concerned with systems that address "theoretical" future needs of the business; they're more likely to relate to systems and processes that can solve present practical problems.

Companies that place the responsibility of strategic planning on their operations people will probably skip planning altogether and continue making short-term, short-range decisions. Though your managers will deny that they're making today's decisions without regard for the future, the fact is that they are. Planning and decision-making hats just do not sit comfortably on the same head; the distinction between them tends to get lost.

A fourth pitfall is to develop strategic plans on a one-shot basis. Planning is educational; you have to employ professionals and you have to teach people to do it. The press of daily decision making and the extraordinary information resources that must be readied for the planning process almost always force operational executives into delaying planning or doing it incompletely; you have to keep people aware of the continuing nature of the process. You have to keep them involved, so they update information from the environment, competition, industry segment and the technology. Most companies scurry around any time they want to plan strategy, reassembling all the needed baseline information. This is just not cost-effective, nor is it feasible in terms of company resources.

How do you motivate a company to get its plan out of the drawer, dust it off and revise it? You're in the ideal position to do that, aren't you?

Carlisle: To start with, most companies don't even have a strategic plan for data processing. It's very difficult to get companies to do a better job in office automation planning than in data processing, particularly since office automation is often considered a stepchild of data processing. The impetus for continued planning must come from professional planners and from those corporate managers who can consider the future as well as the present.

Picking the right lead person is probably the most important part of the entire planning process. This person should have a pretty good understanding of the technology, whether it be data processing, communications or office services. This person should have positive expectations for the future, plus a fully developed sense of the corporate objectives. We've found that the more trust the chief executive has in the leader, the higher the probability that management will understand the ramifications of good planning and that office automation will be successfully introduced in the firm.

The approach to office automation must be broad. Companies are asking, "What word processor should we get for the legal department?" They should be asking, "What should our company do about office automation?"

All too often, the data processing department gets the assignment and falls into one of our four pitfalls. Generally, data processing is the

OFFICE SYSTEMS PLANNING

IN DEPTH

worst group to undertake planning.

Of course, you work primarily with larger companies, Dr. Carlisle. Many small companies are, in fact, looking for a specific item such as word processing. They haven't given much thought to, nor do they seem to feel a need for, comprehensive planning regarding office automation. How should a small company start?

Brignoli: I think that a small company, no matter how it regards office automation, must seriously consider whether it wants to start at all. Benefits and costs must be determined. The best bet is to find a consultant you can trust — one who has the requisite understanding of the problem, who can tell you if your perceived benefits and costs are realistic and show you how to steer clear of the standard pitfalls.

Carlisle: I'll try to comment on this point. A small company must be even more careful in its planning than a large company, because small companies just can't afford to make costly mistakes.

If you analyze the history of factory automation, which is still in its infancy, you'll see that mistakes were made and that there is always a learning curve. To think you can bring office automation in during the next decade without some mistakes and failures, and a lot of learning, is pure foolishness.

When a firm is rigid in its thinking, and its planning is geared toward achieving immediate operational status, no learning takes place. This is inexcusable, but frequently happens because of managers who feel that they can preplan everything. They force regimentation on their people so that no learning takes place. There must be room for experimentation, room for failure, room for learning and growth. When managers try to convince everyone that all their decisions are good, they end up justifying and perpetuating bad decisions.

Not all small companies have the resources to conduct this kind of experimentation. If you can't afford it, here are a few guidelines that may help you decide on a system:

- Don't be first. Let someone else experiment.
- Find at least two or three users of the system in your own industry area and talk to them.
- Do cost/benefit analyses.
- Hire a professional consultant to evaluate your perceived costs and benefits.
- Stay away from single-function systems.

This last point needs some explanation.

Large companies tend to be more highly specialized and can use single-function systems. Small companies need multifunctional systems; you would be ill-advised to install word processing systems without remote dial-in, data processing, forms processing, plus order entry capabilities and several hundred million bytes of storage. Limited functionality in a small company is foolish, because expansion requires you to start all over again. Plan to use the multifunctional capabilities of your system by staggering work hours and bringing in additional shifts to exploit the system.

Small companies must beware of local distributors who say, "I've got just the system (usually a Data General, small Digital Equipment or IBM Series/1 system with custom software) for your industry." What this means is that they wrote software for Joe Smith down the street, and they don't know anything about industry-wide needs. Stay away from vendors who make this claim; custom software traditionally has limited flexibility.

On the other hand, let's assume that a vendor really does have a package that has been improved by nationwide development. Since they give you the package but not the source code, you're bound to the vendor's procedures, forms and data storage mechanisms. This poses an interesting dilemma to which I frankly don't know the answer. You have the choice of going with a vertical industry package or with a set of loosely organized generic tools.

Watteeuw: Some packages are much more flexible than others. You can get a package that combines basics with variables so you can make adjustments for yourself.

Wright: There's another pitfall. If you do buy a package that's fairly successful and allows for modification, you tend to get too involved in doing your own modifications. I've known companies that have become so tied up in rewriting software packages that they end up spending far too much time and money for the projected benefits.

Carlisle: We've already skirted the

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question of strategic planning. No matter what size your company is, you must do strategic planning. In addition, particularly in a small company, you must get a commitment in writing from the power center regarding what they consider important and where they are willing to invest. If you have a pet project that no one in top management is willing to back, don't perform a cost/benefit study to illustrate that it's a good area to invest in. It's much easier to start in the direction that they want.

The second thing is that if you're a small company and you can't afford R&D, do some experimentation so you can learn. That's our motto: Learn before you burn.

You have just suggested staying away from single-function systems. However, if I'm a small company and know that I'm not going to need a multifunctional system for at least four years, could I benefit from leasing a single-function system until my system needs change?

Brignoli: I can't see that as a benefit in any situation. I just don't see anyone reaching that conclusion.

Wright: There are many users who can focus on only one application initially and who react negatively when you suggest a multifunctional approach. Frequently, such users measure their needs only in terms of their immediate expenditures, no matter how effective a multifunctional system might be in the long term.

Brignoli: Well, Jan, that may be true, but if they can't be persuaded to look at the needs of the future, they should probably lease the equipment. They're going to change their minds quickly once their people are educated to the limitations of the single-function machine.

Carlisle: But isn't that decision considerably more complex? These vendors aren't dumb; in a lease deal, they'll get the full purchase price out of you in two years, and beyond that you're paying them pure profit. If you're buying a piece of equipment based on a pure minicomputer or just a printer, they're going to be sufficiently valuable to warrant your having bought them in the first place. Leasing a terminal is crazy unless you're getting an extremely good price on a short-term lease.

Watteeuw: If you sign a two-year lease with most companies, you're going to give them the purchase price of the equipment. The only advantage is the financial terms — you may not have the purchase price in hand. The other advantage is that you can always stop paying the lease if the equipment isn't working right. Under these circumstances, the vendor generally responds quickly to your needs. This may be especially appealing if you're a small company that needs some vendor clout.

Wright: There are also some psychological advantages to leasing. Small companies often buy equipment, but don't reevaluate their applications on a continuing basis — they just keep grinding away with the same equipment year after year. With a lease, you have the opportunity and incentive to periodically reevaluate your equipment, applications and procedures.

Watteeuw: That's changing, Jan. In these cash-scarce days, even small firms — firms with as few as 10 people — are making the financial calculations and asking, "What's my return on the investment?"

Carlisle: There is one situation where leasing may be distinctly advantageous to either a small or large company. Today there are a number of large leasing companies around that are financed by people who are in the 50% tax bracket. These companies are trying to provide their investors with investment credits, and they're looking for write-offs.

They'll give you a lease for one month, two months, whatever, but the most important thing they'll give you is a generous lease/purchase deal. We have gotten as much as 60% to 70% of the lease payments applied toward purchase. By the time you've gone four or five months, they've already taken the investment tax credit, and they're happy to sell to you. This is good if you're in a situation where you are really trying to evaluate whether or not you can make effective use of the system.

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How can users protect themselves, during negotiations or in the contract itself, from product or installation problems?

Carlisle: We always help our user clients to develop exacting performance requirements and include these in the contract. We're also very careful about ensuring that the vendor lives up to the formal and informal agreements made. We write clauses into the contract that assure the user the vendor will live up to their promises. Vendors often make informal agreements during meetings; we record those meetings, transcribe the notes and have them signed. We've saved clients more than $100,000, considerably more than our consulting fees, through this technique.

What we have to watch out for is a "turned-on" user who generally comes out of the DP department. This person is so eager, he can't wait — forget the acceptance tests, forget the other protections, let's buy it. When we are pushed into taking on this kind of job, the project is generally late and extra costs are incurred in beating the vendor into performing what should have been included in the contract and negotiations.

The trick is to write a contract that at least one vendor will accept. If that isn't the most desirable vendor, twist the others' arms so they'll come in your direction. A good contract beats a lease any day. You can always get a good maintenance contract that meets your performance requirements. Some maintenance contracts stipulate that if the vendor doesn't meet the performance requirements, he's obliged to supply you with alternative working equipment.

Brignoli: Good point. I'm always amazed at what vendors try to foist off on users as a purchase agreement or contract. I saw one contract recently that was little more than, "Congrats, you have just purchased our equipment. We will install it sometime during the month of April or May. After we install it, if it breaks, we'll come and fix it between the hours of 9 and 5." No time frame, no mean time between failures, no performance guarantees and no service guarantees outside of normal business hours, which is something you need if you're in a production situation.

I couldn't agree with you more, a good contract is a necessity. You must build in what you require in terms of performance. If your equipment arrives on time in March, but you can't use it until July, you have a very large problem.

Hannan: I certainly can't take issue with the importance of a good contract, but again, the issue is far more complex than it appears on the surface. You could have several potent forces working against getting a good contract in any typical company. You either have people that are too naive to demand the right clauses in a contract, which is the case with most users, or you have DP people who are either too jaded or too pressured to take the time to examine these very important issues.

'One of the biggest errors that companies of all sizes make is that they don't seriously commit themselves to training their people. If you inspect their plans, they always pay lip service to training. But we often find that companies are reluctant to send quality people for training before the system is installed. This frequently spells delay, and sometimes disaster . . .'

What should a good contract contain?

Carlisle: You certainly must include a clause that makes the vendor responsible for all site preparation and contacts with the phone company. You need detailed clauses that specify what responsibility and authority the primary vendor has when dealing with other vendors. Let me give you an example.

The vendor has to tell the phone company what it plans to do and what the requirements are. Normally this must be done in good time, detailed in content and installed in good order. The phone company requires three months' advance notice. The vendor comes along two weeks before delivery with a set of requirements on the back of an envelope. If the contract isn't drawn up properly, the vendor says, "I did my part." Meanwhile, you're sitting there two months waiting for phone installation, the vendor wants his check and you have to pay him.

Many times, users fail to adequately define acceptance tests and end up with equipment that won't perform at the level it seemed to when the vendor presented it. It's nobody's fault but the users' for not having anticipated the problems and stipulated what they expected.

I can't provide you with a standard set of clauses or contract, because almost every contract is different and should be. There are different requirements, vendors, distributors and software people involved. Users must develop a sensitivity to these issues, educate themselves through available information sources and obtain assistance from qualified people.

Jim and Caroline, you have been doing a lot of installations with large companies. What errors have you observed during these installations which could easily be avoided in the future?

Carlisle: One of the biggest errors that companies of all sizes make is that they don't seriously commit themselves to training their people. If you inspect their plans, they always pay lip service to training. But in retrospect it's clear that most firms don't appreciate the importance of freeing good people to complete training on a new system before the final contract is signed.

We often find that companies are reluctant to send quality people for training before the system is installed. This lack of concern for training frequently spells delay, and sometimes disaster.

Watteeuw: It's not unusual for a firm to spend $500,000 on a system and then neglect to spend a few thousand dollars to free key people and have them properly trained. All too often firms think the training they receive from the vendor is enough. Additional training is not only desirable but necessary; one or two hours of training a week is not good enough.

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derstand the system in order to use it efficiently. Often the vendor training people are not really aware of the application and the work environment of the system, so they train users in a generalized manner. True education is teaching the user not only the mechanics, but also to think in terms of an electronic system. When users are educated to think of the system as it will actually work, you see rapid strides in adapting the system to the environment and efficiently utilizing system capacity.

Training continues to be a problem area for many companies. What do you advise companies to do to improve this situation?

Carlisle: Let me try that one. Part of the problem is that in almost all cases, the technical planners and decision makers in office automation are not trainers, nor do they have the disposition for it. Very often they've been technical decision makers in data processing, which compounds the problem. Basically, they're used to hiring professionals with a proven skill, for example, programming in Fortran. They tend to buy people who are already trained; to them, training means getting accustomed to the way "we" do things.

When you move into office automation, the training problem is completely different. Users must be taught to understand the underlying concepts. You have to "infect" the user with these concepts so that they're examined in terms of the user's environment. Here, familiarity breeds innovation, the innovation spreads, and with luck you get continued innovation at different levels within the user group.

What normally happens is that the properly "infected" user begins to train himself. In today's world, continual dependence on professional training is not effective. Companies can't hire professional trainers fast enough to keep pace with the growth of office automation.

Good consultant trainers, who understand the need for continued education and training, will provide their clients with the tools to develop this capacity. Firms should be wary of consultant training companies that provide "face-to-face" training that simply teaches people to type a bunch of letters or send out a lot of messages. A good consultant firm will work with a company to develop procedures and handbooks that continue the training process. In our company we use videotapes that help key users to train other users.

Brignoli: I'd like to comment on what Jim has said. So often you go out and buy a piece of hardware, let's say for word processing. The equipment is demonstrated at a convention, you make the buy and you send people off to the vendor's school for training. When they get back you're amazed to find out that they know little more than they did after the initial demonstration. Real understanding of the system takes place when your people begin to learn from each other. If the group doesn't have the tools to continue the training and exploration process, the cost goes up, and the real benefits of the system are either postponed or never develop at all.

Hannan: To reinforce what Frank and Jim are saying, an effective continuous training program must be based on a body of shared experience on the system. It takes time for that body of shared experience to build up in a company; the cost of gaining the experience must be figured into the cost of training. Without that experience, training can't be reinforced and interactive.

Wright: That's right. Companies of-

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ten believe that office systems don't require the kind of documentation generally found in well-tuned computer systems. The only way to hold on to that shared body of experience and effectively use it in training is to thoroughly document all procedures. Staff turnover alone will destroy office system effectiveness unless users can reproduce their shared experience in documents and carefully constructed training tools.

Any discussion regarding the electronic office inevitably ends up attempting to describe how one should or should not go about measuring productivity and how that affects the bottom line. Can we measure productivity in terms of the knowledge worker?

Hannan: Measuring the productivity of the knowledge worker is a complex undertaking. Paul Strassman at Xerox Corp. has described some interesting experiments that were conducted there. They've defined, tracked and measured many administrative information handling activities. They tracked information handling functions as industrial processes, not as undifferentiated overhead. Needless to say, this represents a massive effort.

On the other hand, Duncan McDonald at Wang [Laboratories, Inc.] says that the concept of treating the office as an information factory is misdirected. You can't look at the office as a place that creates information. Rather, the office is a place that processes and communicates information. The attempt to manage the cost of information handling within this environment in the same way that you would manage industrial and agricultural costs is simply not justifiable.

Carlisle: I know the various positions regarding this argument, but companies often insist that you predict their productivity gains when considering office automation. The problem is that most companies have not defined what they mean by "productivity."

The first thing that should be done is to create a task force to study productivity instead of technology. This task force must examine productivity in the large context. It must identify areas where productivity may be high or low and suggest ways in which it can be measured.

One of the key aspects of the study is a very thorough analysis of the steps needed to develop measurable productivity standards. Is productivity worth measuring? What is the cost of measurement? What can you expect in terms of a payoff? The task force must steep itself in the theory of productivity, paying particular attention to the many pitfalls into which traditional time and motion studies have led investigators.

Independent of these issues, any productivity study that's conducted within the firm must be consistent with how the firm measures its total productivity, whether it's return on investment, return on net assets, profit expansion or some other yardstick. From this analysis you should be able to identify some of the critical indicators. Getting more documents for the same or less money is not a legitimate productivity improvement. Measuring work in the wrong organizational structure is a worthless exercise.

Brignoli: I understand what you're saying, but my experience tells me that cost is an excellent way to measure the increased productivity of a certain section or department. If you're spending less money and producing more output, your productivity actually has increased.

Carlisle: What happens is that management begins to think in terms of introducing new technologies with a specific function in mind and with great assurance that cost can be avoided and displaced. Once the technology is introduced and more people begin to use it and see expanded uses for it, however, the use of the technology logically expands — or at least there's pressure in that direction.

The manager of the department or unit goes back to executive management and says he needs more capital to buy more equipment and he needs more people. The controller goes bananas: "I thought you guys told me this thing was going to displace some

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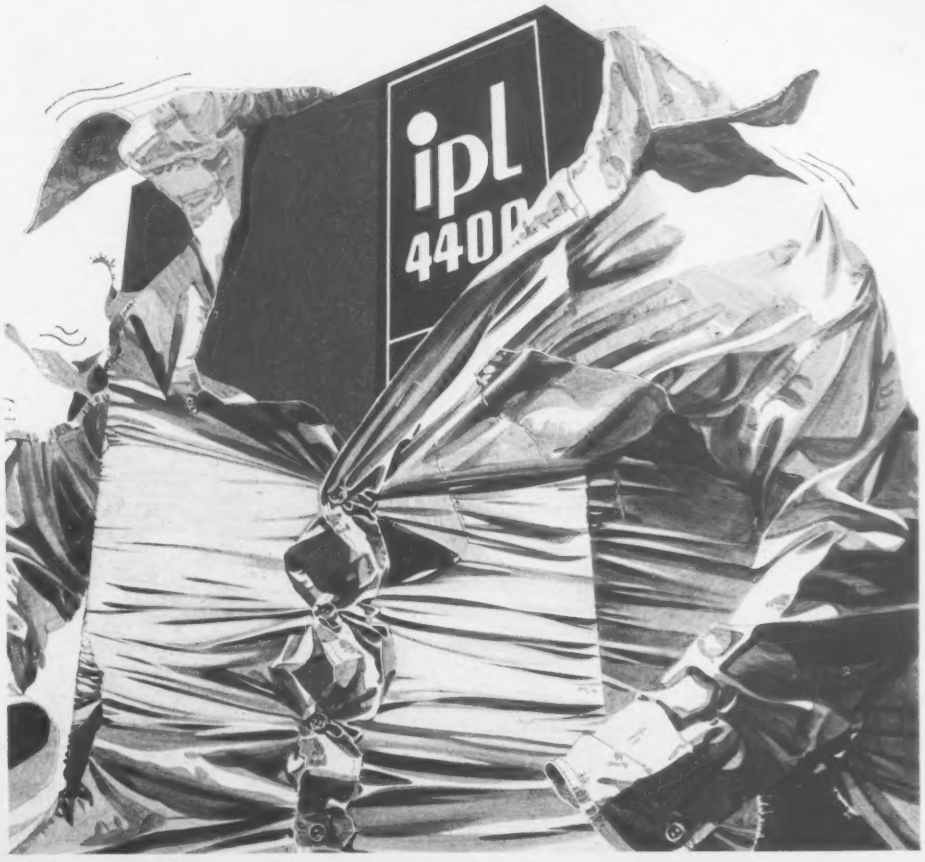

IN DEPTH

costs, and now you want more, more, more." As a planner and implementer of office systems, my experience is that if you play up productivity too strongly, you're painting yourself into a corner.

Watteeuw: It's hard to tell management that the projected cost benefit might not be immediately discernible. It's even more difficult to tell them that the payoff may not come for five years. But still, they want you to calculate the numbers, they want you to measure.

Hannan: What you're asking, Caroline, is how do you instill farsightedness in corporate managers? I don't know. It's been a problem that has been addressed in some of the leading business journals. A recent article in the *Harvard Business Review* suggests that we may be mortgaging the future by turning over the management of companies to accountants and lawyers. Overconcern for short-term profits will do just that.

One of the mistakes that firms often make is equating productivity with efficiency and effectiveness. Efficiency and effectiveness can be improved considerably within a knowledge worker's environment. This is something that newly hatched MBAs have difficulty dealing with. A very simplistic definition of productivity — output per unit input — just doesn't tell the entire story. That's a throwback to the early days of the industrial revolution.

What normally happens when you install an automated system in an environment of knowledge workers is that it improves efficiency and effectiveness, leaving them with more time to improve the quality of their output, to be more responsive, to handle complexity more effectively.

If the "bean counters" don't see an immediate increase in the number of documents produced for the dollars invested, they start having doubts about the system and its management. They never think about the reduction of stress on the worker, the improvement in the quality of their work life, the long-term payoff in the quality of the output. Their method is simply not going to work. So, Jim, I would add to the work of your task force the inclusion of these difficult-to-measure payoffs I have just mentioned.

Carlisle: I think corporate management should carefully examine any automation plan that promises a saving based on a reduced number of people. Where will that saving come from? What's the analysis of that projected cost avoidance? "I need only this many people, but give me $100,000 worth of technology, invest in the training and all of the organizational changes I am asking for." Is my projected saving real or imagined? I find it hard to feel confident about those kinds of projections.

What you are saying, then, is that cost justification is not really possible. In fact, soft reasons are more important when you try to sell office automation to your management.

Carlisle: No, "soft reasons" is the wrong phrase. Numbers are considered hard, because they define simplistic situations. The other reasons are not soft, but infinitely more complex. I think it would be much more accurate to define them as complex reasons.

Watteeuw: When you're planning a move toward automation in the office environment, there are many variables involved — systems interrelationships, for example. To come in and count the amount of paper flowing across somebody's desk is so simplistic that it's almost ridiculous. "Well," somebody says, "if that's not enough, we'll count the telephone calls, the amount of paper, the time spent in the john, in meetings, at lunch and then we'll improve your productivity." This attitude is even more absurd.

Look at the variables, the time variables, the competitive strategy of the company. Does management want this department to expand or contract, does it expect higher quality work, does the department need more training, greater longevity, lower turnover? These are the important variables. These are where management must look to understand the long-term value of office automation.

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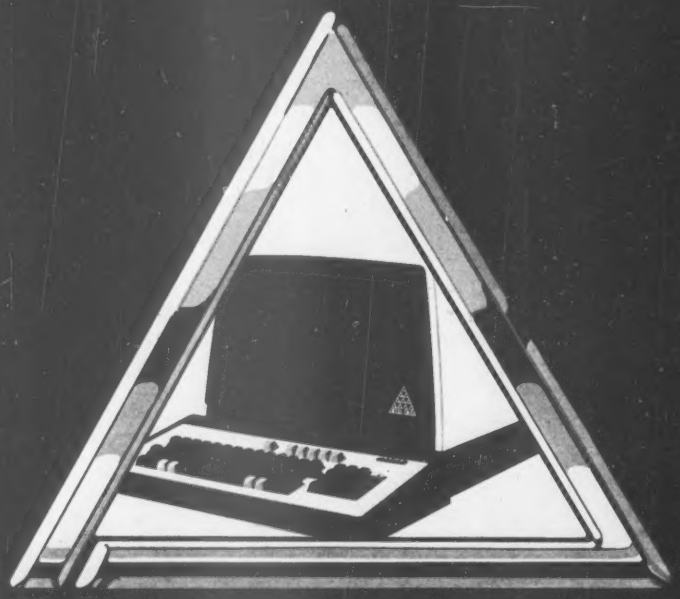

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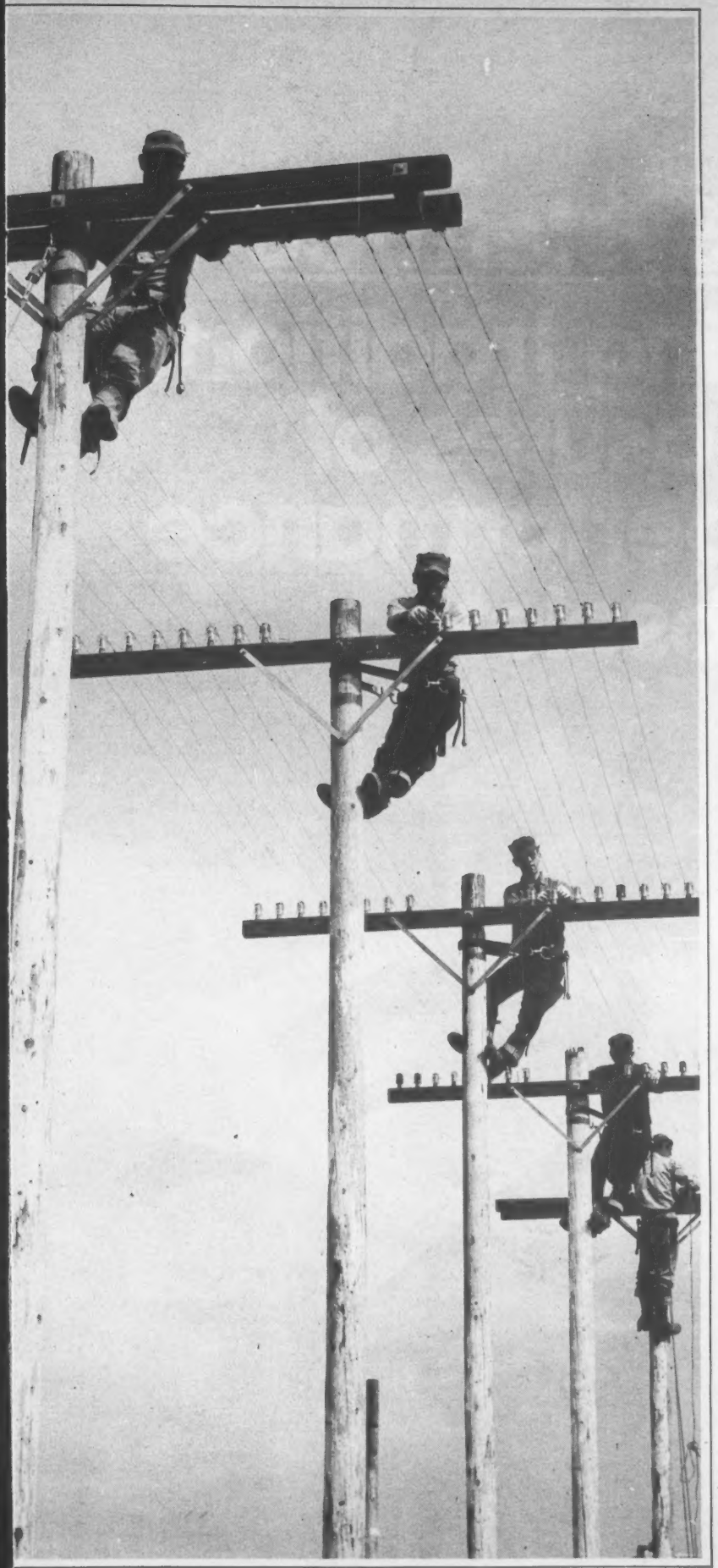

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In the 1930s, telephone company studies postulated that if all calls had to be switched manually, then half the population between the ages of 20 and 50 would have to go to work for the telephone company . . .

SOFTWARE PERFORMANCE ENGINEERING

. . . Likewise, the current demand for software will require a large percentage of the population to work in data processing. The only way to produce more software without a corresponding increase in personnel is to increase productivity.

BY CONNIE SMITH

EVERYONE AGREES THAT INFORMATION SYSTEMS productivity must be increased, but what does this mean? In the context of internal support functions, such as inventory control, payroll, management information systems and even computer-aided design and manufacturing, increasing productivity means producing software that will let employees complete more work in a shorter period of time.

Another facet of software productivity concerns customer service functions such as reservations systems and merchandise check-out systems. Increasing productivity in this context means producing software that will gain customer acceptance (perhaps even attract new customers) by giving rapid, complete and correct responses.

Software engineering principles are crucial to meeting the goal of increasing productivity. A more orderly, manageable approach to software development is essential. Important new aspects of software engineering that can potentially increase productivity are:

- Improved tools and facilities for software development.
- Powerful specification and implementation languages.
- Effective human interfaces with software.
- Software performance engineering.
- Appropriate modularizations.
- Enhanced adaptability and reusability of modules.
- Assurance of correctness.

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tween satisfied customers and disgruntled customers. High-performance internal support systems are vital to a firm's day-to-day operations. And the most valuable corporate resource of all, personnel, cannot be effective without rapid computer response times.

Software performance also affects the productivity of computer specialists. Consider the following case in point:

A large-scale software design and implementation project is scheduled to be completed in two years. It involves approximately 200 modules and a total of 150,000 lines of code written in a high-level language. There are 40 computer specialists working on the project.

Delays in task completions begin to impact the schedule in the late-design / early-implementation stages. The situation gets progressively worse. The system integration phase, originally scheduled to take four months, takes one year. In order to compensate for the schedule delays, the implementation of many system functions is postponed until after delivery of the initial system.

The extensive time required for the integration phase is due, in part, to the long turnaround time required for systems tests. A special task force is assembled to investigate the problem and tune the computer environment to improve turnaround time. This takes six months.

The users of the initial release of the software find the response time unacceptable. Rather than the expected response time of 3 to 5 seconds, it is actually 3 to 5 minutes!

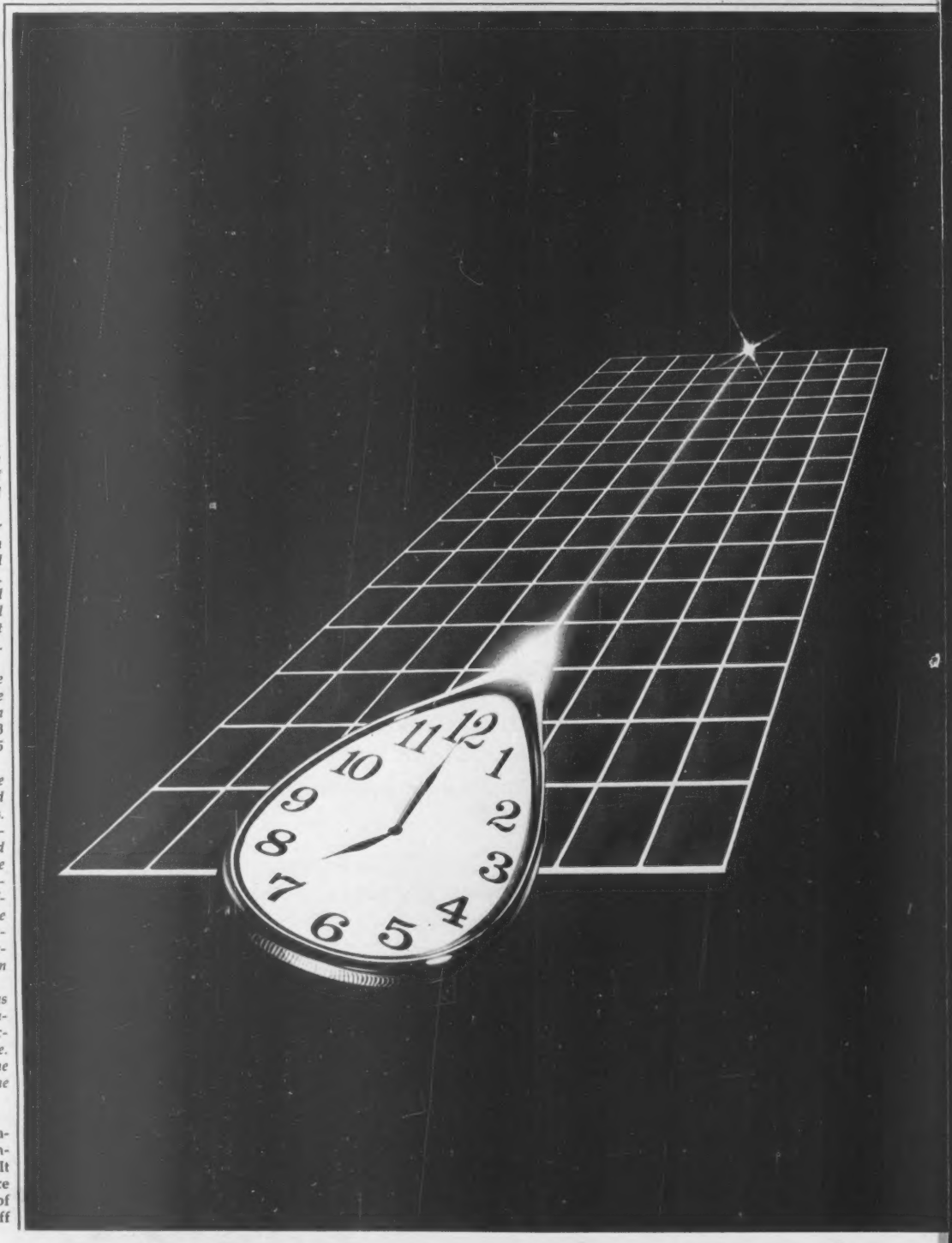
Once again, a special task force is assembled to investigate and correct performance problems. This time, however, software design changes are required and the corresponding code must be revised and retested. This requires an additional year of effort involving 20 people while the rest of the staff works on incorporating the additional functions that were omitted earlier in the project.

Serious personnel problems arise. Frustrations and disillusionment lead to job dissatisfaction and a high turnover rate. This poses a grave threat to the satisfactory completion of the project.

This is a hypothetical situation, but the scenario is unfortunately quite common. It illustrates that performance impacts the productivity of software development staff in two ways: the extra time required for implementation because of poor responsiveness, and the time and effort required for design and program modifications to correct performance problems.

The problems arise as a result of the "fix-it-later" approach: Performance is considered not at the outset of a project, but only when it becomes a problem. Productivity can be increased by *preventing* these problems, thus making better use of the resources that would have been required to correct them. In order to do this, performance management techniques must be applied early, from the initial design stage throughout the project's life cycle.

This approach to performance management is called performance engineering. Despite its potential benefits,



this approach is rarely used. Reasons for this resistance, as well as suggested ways to remove most of the obstacles, will be covered later in this article.

The performance engineering process will be described in detail, including a strategy known as Adept (A Design-based Evaluation and Prediction Technique), used in the analysis of the software. Emphasis is on the use of Adept rather than its technical details, since they can be found elsewhere[1,2]. We will then examine factors that influence the successful implementation of the performance engineering discipline and offer suggestions for instituting it.

The material presented has been formulated through experience. Large-scale software systems have been studied throughout development and the techniques have been used to study the performance issues. The discussions address many of the observed problems that can diminish the effectiveness of Adept.

Design Afterthoughts

Performance is not an add-on feature. Software performance can be improved later, but the results are not as good. Consider the analogy of a house constructed 15 years ago without energy efficiency considerations:

Houses at that time were energy-inefficient and practically any modification today yields an improvement. Minor modifications such as adding weather stripping or insulated electrical outlets are easy and fairly inexpensive. The improvements in overall efficiency are negligible, however, if no other modifications are made.

An intermediate step is to replace the central heat and air conditioner with an efficient heat pump. This is much more expensive, but yields a better payoff. A major step is to tear out walls and floors to add good insulation. This is very expensive and disrupts the household in the process, but the combined improvements are dramatic.

The efficiency of the house after all feasible modifications are made is still not as good as if the house had been constructed with efficiency as a design goal. The original design could have incorporated many passive solar features that cannot be added later; it is not generally feasible to change the direction that the house faces years after it is built.

Software systems have similar characteristics. It is possible to tune an existing system to improve performance, but the gains are usually modest. Dramatic improvements generally require major modifications to the software, which are expensive and require considerable implementation time. It is infeasible to change the fundamental data structures of the software, for example, the control block concept of OS/360.

Another disadvantage of the "fix-it-later" approach is the detrimental effect on software integrity. L.A. Belady has reported that many of the benefits of the software engineering discipline, such as clarity of structure and program text, are negated by tuning modifications[3].

It is far better to consider the performance goals when

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the software is designed in order to achieve maximum effectiveness at minimum cost. Figure 1 contains a synopsis of the performance engineering considerations. In it, performance is a primary consideration throughout the life cycle. During the requirements definition and initial formulation of the software design, a performance analysis checks the feasibility and desirability of the functional architecture.

The next step is to determine the configuration that will be required to support the new product, that is, the power of the supporting hardware and operating system software. These are not independent issues: The design depends on the requirements, and the configuration will vary with the design. Therefore, several combinations of requirements, designs and configurations must be evaluated to determine the best combination.

This is best illustrated by example. First, consider the following specification of the requirements of the LOCATE command of a data base management system (DBMS):

The LOCATE command is to determine the location (address) of all data that satisfies the associated condition clause and build a scratch file containing all qualifying addresses. Later, the RETRIEVE command can be used to fetch the desired data. Only the results of the most recent LOCATE command are to be saved. The addresses in the scratch file will be sorted into ascending sequence (to improve the efficiency of the retrievals).

The evaluation of a DBMS is a complex process. No single command in the system can be evaluated in isolation; the entire system must be considered. In this example, the performance of the LOCATE and RETRIEVE are interrelated.

Similarly, the performance of the system depends on the work load; the system and its work load are evaluated together. Specifications for several representative application programs that include both of these commands (and others) must be used in the evaluation.

Figure 2 gives a more specific analysis through two representative application programs. The times shown are the best-case response time for each program with a single user (there is no competition for system resources). First, the requirements and functional architecture are evaluated. Case 1 is the initial specification described above. Since the sort is a time-consuming operation, Case 2 shows the impact of keeping all addresses in sorted order so that the extraction of qualifying records automatically produces a sorted list. If the restriction to a single scratch file is eliminated, intermediate results can be retained and used later to further qualify desired data.

Case 3 shows the results of this evaluation. Case 4 shows the combined improvements attained by both Case 2 and Case 3. The evaluation concerns both the data base system and the application programs.

Cases 1 through 4 show improvements to the DBMS by modifying requirements specifications, while Case 5 reflects design optimizations made to one of the application programs. Since the response times of even Case 5 are unsatisfactory, additional configurations are evaluated. Cases 6 and 7 show the improvements that can be realized by using a CPU twice as fast and by upgrading both the CPU and I/O devices to the fastest available.

Note the dramatic differences between the response times in Cases 1 and 7. Case 1 is clearly unacceptable and would result in a "crisis mode" tuning project such as that described earlier. Using Adept, analysis results such as these can be obtained *before coding is begun.*

Design modifications at that time have much less impact since code need not be revised. The hardware configuration requirements are identified early in the design phase, providing sufficient time to conduct an orderly procurement process and acquire any additional hardware deemed necessary prior to system integration testing.

The results shown in Figure 2 are approximate and subject to change, since software systems are rarely implemented exactly as originally designed. The resource requirements

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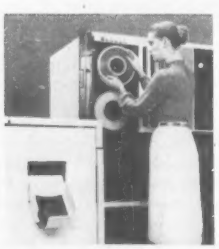

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upon which the analysis is based are estimates and, during early design stages, they are imprecise. They are, however, sufficiently accurate to support the conclusion that Case 1 is unsatisfactory.

In addition, the analysis indicates which estimates are critical with respect to performance. Thus, these "critical components" can be implemented first and optimization efforts concentrated on them for maximal impact. They can then be measured and the actual resource requirements can be substituted in the analysis to yield more accurate results.

In Later Stages

Performance engineering concepts are also important in later stages of the software life cycle to study algorithms, monitor progress and assess the impact of design and implementation changes. They are important even after the implementation stage, during maintenance.

It has been estimated that maintenance accounts for 60% of the software's cost[4]. This maintenance usually includes software redesign to incorporate additional functions; thus the revised system is subject to the same performance pitfalls as the original design. The maintenance often includes tuning to improve performance, so if the concepts are used throughout the life cycle, the maintenance costs can be reduced.

What Rewards?

Engineering for performance throughout the life cycle has the obvious advantages of improving the quality of the software product and increasing productivity in both its development and use. And there are other beneficial effects:

- Clients are involved in additional phases of software development, resulting in better work-load specifications and thus a product that is customized to fit its typical uses. Design deficiencies can also be detected much earlier. Studies have shown that most software errors are made during the design phase. The cost of correcting the errors late in the life cycle is dramatically higher than in early stages (as much as 100:1)[4].
- The analysis procedure includes an initial integration of software component specifications. When this is accomplished early in the design stage, many potential problems are precluded since design inconsistencies are detected and corrected before coding begins.
- The early identification of components that are critical with respect to performance provides information that can be used for more effective project management.

Barriers to Use

Since performance engineering is clearly an effective way to increase productivity, why is it rarely used?

1. Current management emphasis is on timely project completion, a goal that is too narrow in scope.
2. It is not typically included in project schedules and there is rarely enough uncommitted time to devote to extra activities.
3. The techniques for evaluating software performance prior to its implementation are not well established, and it was previously infeasible to perform the analysis.
4. A high percentage of software development staff typically lacks experience in implementing large-scale systems and thus is not aware of the potential performance disasters or of the benefits of performance engineering.

In order to improve the situation, a number of changes are required. First, the management emphasis must be modified to address the timely completion of a good product (where performance is an important aspect of "good"). These are occasionally conflicting goals, since building good software could adversely affect timely completion of project milestones.

Second, schedules must incorporate the additional performance engineering tasks. One does not expect to go to a restaurant, order a steak well-done, receive a rare steak in the anticipated 15 minutes, then wait another 10 minutes for it to be returned to the kitchen to finish cooking. Rather, good restaurants inform customers ahead of time that the dish they have ordered requires a little longer to prepare. Similarly, good software products may take longer to build, but the overall time required to put it into use will be less if it does not require subsequent corrections.

The resolution of the third problem is more complex. The ideal solution is to use a comprehensive computer-aided design tool that allows the systems designer to obtain feedback interactively on the overall quality of proposed designs. The use of the tool should not require specific knowledge of the particular performance analysis techniques; they should be transparent to the designer. Unfortunately, there is no comprehensive design tool available.

There are, however, several tools that can be used by a performance analyst (as opposed to a systems designer) to assist in evaluating software prior to implementation[5,6]. The analysis techniques are not particularly difficult and an experienced performance analyst can master them relatively quickly.

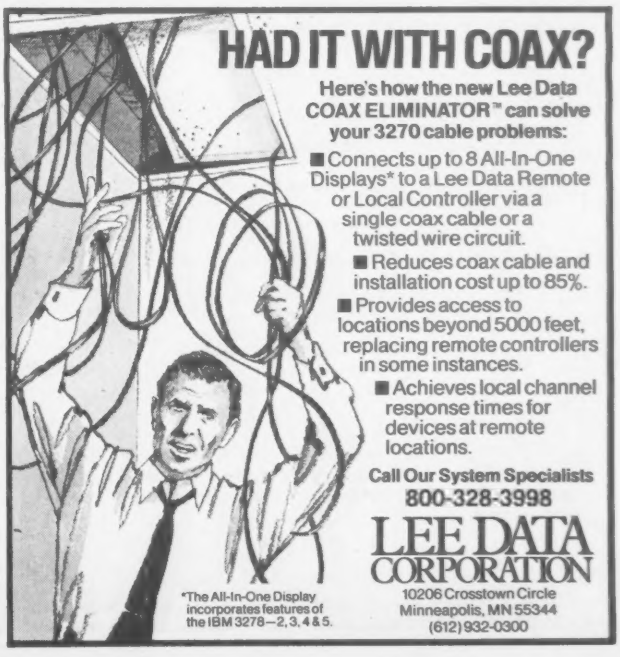
An additional complication is introduced when the evaluation is done by a performance analyst: communi-

Life Cycle Stage	Performance Considerations
Requirements Analysis Functional Architecture	How will the software be used? Can the requirements be achieved with reasonable performance? Approximately how much computer power is required to support it?
Preliminary Design	Is the expected performance of this design satisfactory? Is the proposed configuration satisfactory? Which parts of the system should be watched closely?
Detailed Design	Have changes occurred that affect earlier predictions? What is a more realistic estimate of the projected performance?
Implementation Integration Testing	How does the performance of the implementation alternatives compare? Have any unforeseen problems arisen? What are the resource requirements of the critical components?
Maintenance	What is the effect of the proposed modifications? What are the long-range configuration requirements to support future use?

Figure 1. Synopsis of the Performance Engineering Considerations

Estimated Response Time (seconds)	PGM 1	PGM 2
Case 1: Initial requirements	3,326	49
Case 2: Without sort	694	48
Case 3: Multiple files	595	37
Case 4: Combination 2 & 3	562	36
Case 5: Modified application	109	NA
Case 6: Faster CPU (twice as fast)	57	18
Case 7: Largest configuration	26	7

Figure 2. Results of a Design-Based Software Evaluation



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cation. Specific information on the design characteristics must be imparted to the analyst, and the information must reflect the design's current state. Analysis results must be returned to the designer at suitable levels of detail and in sufficient time to affect the design. The endeavor must be cooperative — a team effort — if it is to be effective.

The first step is to establish a team with expertise in three areas: the intended use of the software, its design and software performance analysis. The chief architect of the software is the obvious choice to head the team. Participation of additional people such as an expert on the host system configuration may sometimes be required temporarily when additional information is needed.

The team begins the performance engineering early in the design stage, just after the initial functional architecture is chosen. The purpose of the first analysis is to rule out designs that are potentially disastrous, select a suitable one and identify potential performance problems. It may also be used to identify the necessary configuration.

The team conducts a performance-oriented design walkthrough in order to gather the information for the first analysis. The following procedure has been used effectively and is suggested as a model:

The client representative begins by describing a typical scenario or task that will involve the software from the user's point of view. An example is shown in Figure 3. The software designer then describes the processing necessary to accomplish the user's task, as in Figure 4.

The performance analyst participates in these two discussions and asks pertinent questions, as in Figure 5, to obtain the data necessary for the analysis. The analyst then summarizes the scenario and software processing, from the analysis point of view, to verify that the information was correctly interpreted.

The process should be repeated for several representative scenarios; this may require multiple walkthroughs. The initial ones cover most of the necessary processing details, and later ones only cover new information.

It is unreasonable to expect that such walkthroughs can be conducted spontaneously. They require preparation by client representatives and designers and communication between them. It is also unreasonable to expect that all questions will be answered during the walkthrough. Many of them can be resolved, and a list of outstanding questions can be prepared that will facilitate later information gathering.

After the walkthrough, the performance analyst gathers the relevant information, conducts the evaluation and presents the results and recommendations to the team. The team then decides on the most appropriate course of action.

Additional walkthroughs are conducted at later stages in the life cycle to update the information for the analyses, compare the early results with the current results to see if problems have arisen and to look at the effect of replacing the early, optimistic assumptions with more realistic ones. Since more detailed information is available, more complex analysis techniques are justified at this point.

First Analysis

The following information is necessary for the first analysis:

- Work-load specifications.
- Software structure.
- Execution environment.
- Performance goal.
- Resource requirements.

The work-load specifications are obtained from the description provided by the client representative. It includes, for example, the number of on-line users and the activity level (rate of requests) of the task. The software structure is obtained from the designer's presentation. It includes the functional components of the software and the execution paths through the software to complete the specified task.

The execution environment includes information on the (anticipated) hardware configuration and the operating system overhead, such as the type and speed of the CPU, configuration of I/O devices and whether virtual, paged memory is used. General information, such as the

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Sample Contribution of the Client Representative

This scenario is a query from a terminal asking for a list of all parts required to build a particular assembly. It consists of 20 subassemblies composed of 10 smaller pieces, each containing five parts.

The user enters the identification number of an assembly and indicates the type of information desired. The choices are:

- A detailed list of parts showing the top-down relationships between parts. The highest level part is shown first, each lower level of detail is indented. (An illustration accompanies the description.)
- A summary of the unique parts, the total number required and the cost.

Engineers will use the query to validate data and obtain information for inventory control.

Figure 3

Sample Contribution of the Software Designer

The request is received from the terminal and passed to the "query parser." It is translated into standard data base commands which are sent to the "data base control system." The descriptive data for the assembly is "located" then "retrieved." The information on all internal parts is then "fetched." It is "formatted" appropriately and "sent" to the screen.

The "fetch" of the internal parts is accomplished by "locating" the 20 subassemblies and "retrieving" them one at a time. For each one, the parts it contains are "located," then "retrieved" and so on.

The "locate" consists of calling the "access module" to search a b-tree containing the identification number of each part and a pointer to a list of addresses where the information on all parts with that number is stored. The list is then "read" and "sorted" and a scratch file containing this information is "written."

Figure 4

mainframe vendor and model, is usually known a priori, and specific information, such as devices and speeds, is obtained from other experts.

The performance goal is derived from management, client and designer expectations. An example of a reasonable goal for a typical on-line transaction is an average response time of 3 seconds and a maximum of 10 seconds. The resource requirements include information on the expected resource usage of each of the software components. The primary specifications of interest are CPU time, number of I/Os, memory requirement and operating system calls.

The "garbage-in, garbage-out" (Gigo) principle unfortunately applies to the performance analysis. That is, the relevance of the results depends on the accuracy of the data upon which the analysis is based. The situation is complicated by the fact that only *estimates* of resource requirements of proposed software can be provided prior to implementation. This fact is the impetus for the Adept analysis strategy.

Typical Questions Posed by a Performance Analyst

Please clarify the "detailed list of parts."

How often will the engineers use the query?

How many will be using the query concurrently?

How do they get the information now? How long does it take?

How big is the data base? What is the proposed data base organization? What is the size of the keys? How many are there? How much associated information is stored for each key?

What is the b-tree structure?

How long does the query parser take? Or alternatively: How much CPU time does it use? How many lines of code does it have? How many I/Os are issued?

What is the record and block size of the scratch file? Is it buffered?

How many words of information are sent back to the engineer?

Figure 5

The Adept Technique

Adept is an analysis technique used in conjunction with the performance engineering discipline. It was developed by C.U. Smith in cooperation with Dr. J.C. Browne at the University of Texas at Austin and Information Research Associates. The research was supported by the National Aeronautics and Space Administration, Langley Research Center.

A unique feature of Adept is the strategy used to combat the Gigo principle and support the performance engineering process. First, the accuracy of the results is improved by using specifications for both expected resource requirements and upper bounds. (If the performance goal is satisfied for the upper bounds, the design is likely to be suitable.)

The results pinpoint components that are important with respect to the accuracy of resource requirements. If those components are implemented first, the resource requirements measured and the actual data used in subsequent analyses, the forecasts become more accurate. If feedback is provided to designers on actual resource requirements vs. estimated requirements, future studies will be more accurate.

The second aspect of the strategy is to begin with a simplistic analysis of the performance in a best-case situation and introduce more sophisticated analyses of realistic cases as more detailed processing information becomes available. The initial concern is to identify feasible designs and eliminate potentially disastrous ones. Since the analysis is based on estimates, a complex, costly, time-consuming initial evaluation is not justified.

The rationale for the best-case analysis is to focus attention on designs and potential improvements and to eliminate arguments about situations that are likely (or unlikely) to occur that would result in better (or worse) response times.

For example, an analysis might show that the *average* response time is 25 seconds. Arguments could ensue about how likely it is that the "average" situation will occur, what particular combinations of input data will cause better (or worse) responses, when they will occur and so on.

But an analysis that shows the *best* response that can be obtained is 20 seconds indicates potential problems. Any arguments about specific situations that could occur are superfluous since the response in those

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SPACE-SAVING DESKTOP DESIGN	✓	✓			✓
BASIC LANGUAGE	✓			✓	✓
UNATTENDED NETWORK CONTROL SYSTEM	✓		✓		✓
WORD PROCESSING	✓		✓	✓	✓
EASY-TO-READ FULL 15″ CRT			✓	✓	✓
SIMULTANEOUS DUAL TASK OPERATION	✓	✓	✓		✓
PROGRAMMABLE OPERATOR HELP KEY					✓
3270 SDLC EMULATION		✓	✓		✓
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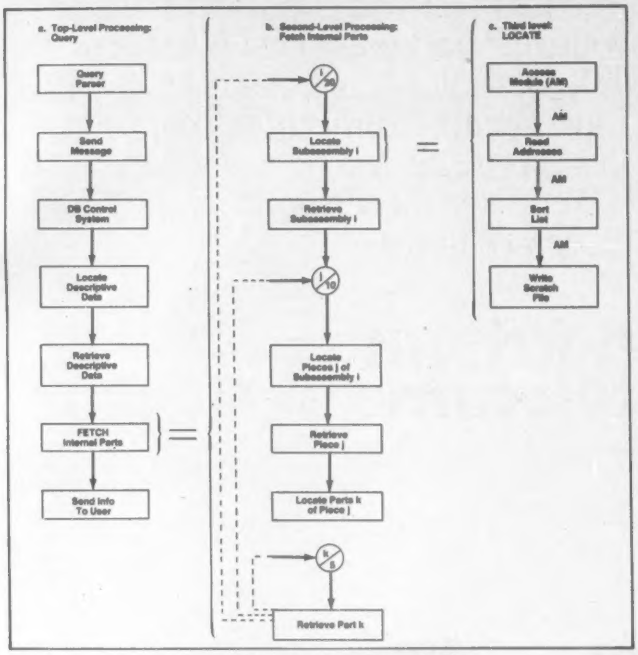

Figure 6. Scenario Execution Graphs

cases will be worse.

The data provided in the walkthrough is collected and the software structure is extracted. A graphical representation is used to depict the structure. Functional components are considered nodes, and links are considered arcs. The graphs are hierarchical, with the lowest level containing complete information on estimated resource requirements.

Static Analysis

The graphs are first used for a static analysis to derive the mean, best-case and worst-case response times. The static analysis is based on the optimistic assumption that there are no other jobs on the host configuration competing for resources. It begins with the computation of the elapsed time and resource requirements for each function at the lowest hierarchical level of detail.

The time for the set of nodes and arcs at this level is calculated and used for the corresponding node at the next higher level of design. The elapsed time for that level is then calculated and used in the next higher level until, ultimately, the elapsed time and resource requirements for the top level of the design are known. The results are then compared with the performance goal and evaluated accordingly.

An example of the execution graphs and response time calculation for the scenario described in Figures 3 and 4 appears in Figures 6 and 7. More specific information on using execution graphs to reflect software structure and rules for response time calculations may be found in *Performance Analysis of Software Systems: A Design-Based Approach*, by J.C. Browne and C.U. Smith.

Additional techniques are used to study the host configuration requirements and environmental complexities, such as data dependency and competition for resources. When resource requirements depend upon the data that must be processed, parameters are introduced to represent the data objects upon which performance depends.

Queuing network models are used to analyze the additional delays introduced when software competes for host configuration resources. Special queuing models are used to study the effects of concurrent processing, such as locking data base indexes and synchronizing concurrent events. Parameters for all of these models are derived directly from the execution graphs.

Success Insurance

A number of factors have been found to be crucial to the success of a performance engineering project:

- Management commitment.
- Schedule adjustments.
- Credibility of results.
- Timeliness of results.
- Justification of recommendations.
- Optimistic vs. realistic analysis.
- Cooperative effort.

Management commitment to the performance engineering concept is vital. It is futile to expend the effort if the results are always ignored in favor of "timely" implementation of a less desirable product. The development schedule must include the performance engineering tasks and must accommodate the necessary reactions to the study's findings.

The supposition that it takes a little longer to build a quality product must be accepted. This is not to say that it takes substantially longer. In fact, if there are no major performance bottlenecks, the additional time required is negligible. If there are bottlenecks, the total develop-

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ment time would have been much longer anyway.

Steps must be taken to ensure the credibility of the results. This means that the user scenarios must be representative of the anticipated work load, critical resource estimates verified as soon as possible and the competency of the performance analysts established.

In addition, timely results are necessary if they are to have the desired effect. This implies that the performance analysts need experience before tackling a complex software system. There is little time during the project to learn the analysis techniques or to develop new ones, then prove their credibility.

It is important that any recommendations for improvements be supported by data on expected performance gains. Improvements that are intuitively obvious to a seasoned performance analyst are not always so obvious to a software expert. Data such as that in Figure 2 is much more impressive (and convincing) than a statement that "the proposed design will have unacceptable performance: the addresses should be stored in sorted order and multiple scratch files should be allowed." Quantitative data is also needed to evaluate the expected gains against the effort needed to incorporate improvements.

A stategy was previously discussed for beginning with an optimistic analysis and gradually introducing more realistic models. The principal advantage of this strategy is that it focuses attention on the potential design problems rather than on the model assumptions. A secondary advantage is in matching the depth of the analysis to the accuracy of the data.

It is important to move from the optimistic analysis to the more realistic one. Otherwise, performance may appear to be satisfactory but, since the best case may be rare, the actual performance might be unsatisfactory.

Finally, the atmosphere must be one of cooperation rather than competition. Members of the team must work toward a common goal: to develop a good software product. Occasionally, they will detect inefficient user applications, inappropriate designs or analysis errors resulting from incorrect assumptions. It is important to remember that the goal of performance engineering is to detect problems before it is too late.

When found in early stages, the problems may be small embarrassments to those responsible, but if they are not detected early, they might become scandals.

Preparation Stage

The expertise required to make up a team is generally available. Organizations usually have a client representative, a person familiar with the software design and a performance analyst. However, a team needs to be familiar with the performance engineering process and techniques such as Adept before it attempts to apply them to a large development project.

This can be accomplished in several ways:

1. Find team members with experience who can educate other members.
2. Use experienced consultants on the team.
3. Study a small pilot project and learn through experience.

The first strategy is certainly desirable, but may be difficult early on.

Consultants can provide guidance and save valuable analysis time, but their effectiveness depends on the nature of the organization. If consultants are generally viewed as experts and their opinions are valued, the results will likely be good. If, on the other hand, consultants are distrusted and the opinions of colleagues are

Component	Elapsed time (seconds)
a. LOCATE	
Access module	0.010
Read addresses	0.021
Sort list	0.002
Write scratch file	0.018
Procedure call overhead	0.008
Total	0.059
b. Fetch Internal Parts	
Locate subassembly i	1.18
Retrieve	0.15
Locate internal parts j	11.80
Retrieve	2.99
Locate internal parts k	11.80
Retrieve	14.93
Procedure call overhead	3.32
Total	46.17
c. Query Scenario	
QLP	0.50
Send message	0.02
Control system	0.95
Locate descriptive data	0.06
Retrieve descriptive data	0.02
Fetch internal parts	46.17
Send info	1.60
Procedure call overhead	0.01
Total	49.33

Figure 7. Computation of Elapsed Time

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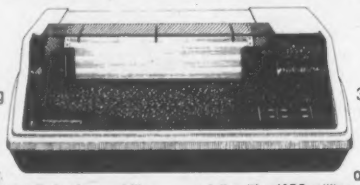

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highly valued, use of consultants is not a good approach. In any case, consultants should be used to educate the team by demonstrating the procedure so that team members learn how to carry out the performance engineering process themselves. The team should participate in the analysis rather than just observe the results.

The pilot project is a good approach to getting started. The software system should be small and implemented in a relatively short period of time. It is also helpful to use an existing system that requires a few modifications. The principles of performance engineering should be applied as described, even though the project is small.

Actual software performance results should be compared with the forecasts. If they are different, the discrepancies should be investigated and problems reconciled. Lessons that come out of this process are always valuable and should be documented for the benefit of others.

Overlooked Aspect

Performance is an important aspect of software quality that is often overlooked. Software performance engineering can increase information systems productivity by utilizing software development staff better, accelerating interactions with internal support systems and improving customer satisfaction. Software quality is improved since performance is better, software is customized to the work load and its integrity is strengthened.

The procedures suggested here can be applied easily. Success is likely if the organization commits itself to the performance engineering concept, incorporates the tasks in the project schedule and uses a cooperative team approach. With techniques like Adept, it is feasible to evaluate software performance early in the life cycle. By taking the recommended precautions, an organization can prevent crises rather than having to clean up after them.

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All decisions of the judges are considered final and no representations as to their competence, skill or fairness are being made. Deadline for entries is December 31 in our offices in Framingham, MA. All entries become the property of CW Communications/Inc.

HINT: Quality is more important than quantity. Sending in lots of entries will not increase your chances of winning (in fact, reading through a slew of similar slogans from the same person drives us nuts!) Write down everything you can think of that tickles your fancy, then take a while to pick the two or three best ones to send in.

Yes, I'd like to enter your ridiculous button contest. I have read the rules. (I hope your judges can still read when they get to this one.) Here is my entry (if you have more than one, put them on separate forms).

Write your entry here: _____

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_____

Name _____

Company _____

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About the Author

Dr. Connie U. Smith is an assistant professor of computer science at Duke University in Durham, N.C.

She has 13 years of experience in data processing. Her interest has extended to computer performance analysis, systems programming, telecommunications network analysis, software evaluations, systems analysis and programming, as well as teaching.

Smith received her B.A. in mathematics from the University of Colorado at Boulder and her M.A. and Ph.D. degrees in computer science from the University of Texas at Austin.

Timely Training

By Steve Comstock

Many people mistakenly believe that training causes productivity to increase. In fact, training will have no appreciable impact unless it is timely and appropriate. Another essential ingredient is the motivation to apply new knowledge and skills back on the job.

Appropriate training does not cause, but rather *allows* productivity to increase. This article discusses appropriate training for data processing staffers and briefly examines methods for locating or creating cost-effective training.

Training is timely and appropriate when it addresses the specific needs of the student. For example, it is inappropriate to offer a course in OS/VS JCL to an experienced systems programmer or to schedule a CICS class after an applications programmer is supposed to have coded a CICS application (although better late than never).

A training program must address four general skill and knowledge classifications: technical, professional, personal and interpersonal. Let's examine these in more detail.

1. Technical. Technical training is the most common type provided in installations that offer some training. While it is most obviously needed, technical training is often treated haphazardly and inappropriately. To be relevant, technical training must take into account the needs and plans of the DP department: What are the plans for maintenance, ongoing projects and new implementations? Is there a planned change in operating system, hardware, programming language? Are new standards, software packages or procedures being implemented?

Once a manager has become familiar with his organization's plans, he must then consider each member of the staff in terms of his current skill levels and assignments and in light of his probable future needs and assignments. As part of the process, the manager must find out each person's career aspirations. This process is often called a "skills inventory and needs assessment" in the lit-

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erature. There are several ways to conduct a skills inventory and needs analysis. Some companies, especially the multimedia vendors, offer either the total service or some supporting materials (forms, report software and so on). This may indeed help a manager organize the process, but there is a tendency to use such services as an easy way out.

Skills inventories and needs assessments are useful only as a regular, ongoing processes administered by all managers. Often, one of the most pressing needs for training in a DP shop is for managers and supervisors to learn how to conduct these assessments.

A common problem with technical training is that some staffers are left out. Too often, technical training is reserved for programmers and systems programmers. But analysts need training, as do operators and managers. Managers of technical staffs need some constant technical updating: not detailed, but enough to converse intelligently.

User Training

Most recently, many user departments, frustrated by a nonresponsive or indifferent DP operation, have purchased their own minicomputers to get some project done. Understandably, this creates antagonism between DP and user departments. Technical training for users is an excellent way to alleviate this problem.

The objective must not be to try to force the users back to the DP department's control — at least not immediately. The DP department can provide useful technical training to help users: (1) understand basic computer concepts, (2) understand the reality of the DP environment, (3) design and plan applications better and, if necessary, (4) do a better job of installing and maintaining that minicomputer.

It is self-defeating for the DP department to hope the unsatisfied users will get a mini (if they haven't already), launch a project and then fail, so they have to come back to the DP shop. If DP could not serve them effectively before, and nothing has materially changed, it will not be able to serve them now. A much more positive approach is to provide good training and guidance and wish them well.

On the other side of the coin, the DP department can get some good technical training from the users. In their own way, accounting, personnel, inventory control, subscription fulfillment, billing and other functions are just as technical as DP. Most DP staffers can benefit from some technical training in the application areas they service.

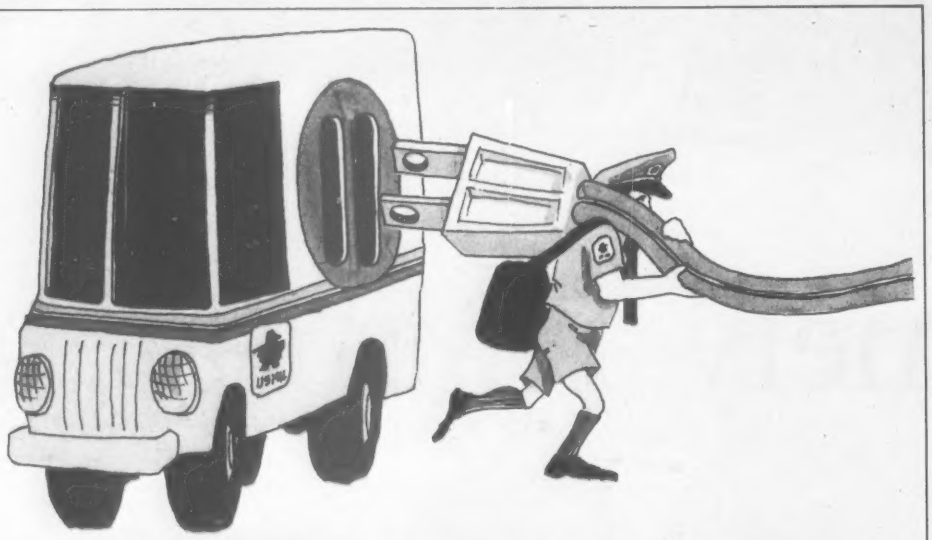
Refresher Training

One last area of technical training deserves mention. Many people who have practiced their profession for a long time deny that they need training. They make themselves obsolete, however, by holding on to old ways of doing things, forgetting skills they once had if they do not use them regularly and refusing to learn about new methods and products. These people need refresher or update courses desperately.

First of all, these employees need steady, gentle, understanding pressure from management to keep current. It may help to have them attend short (half-day or less) refresher sessions that are called, only somewhat disingenuously, "advanced." Another way to address these particular needs is to ask these employees to assist in the training function themselves: as resource people, lecturers, tutors or developers of supporting materials (more on this later).

2. Professional. Everyone in DP needs some professional training, although in varying amounts and kinds. Professional training may not be immediately applicable to the individual's current assignment, but it broadens his perspective of the field, allowing him to develop deeper insights as to possibilities and potentials. Through this training, each person can prepare for the technical training of his future, since he gets some glimpses of it.

Professional training may include classes likes James Martin's seminars or some of the Infosci offerings that concern themselves with more general, philosophical issues. But it is just as likely to include users confer-



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ences or specialty group meetings (for DP trainers, researchers or users of particular hardware or software products) and reading in journals or other publications.

Professional training tends to be somewhat more nebulous than technical training and more difficult to identify, schedule and budget. Nevertheless, it should be an integral part of an effective training plan. Often, the DP department experiences the benefits of professional training indirectly in terms of lower turnover rates and higher morale. In the long run, professional training pays off in a staff that is in the forefront of the profession, highly motivated and very productive.

3. Personal. Personal training is directed at improving an individual's ability to function. This would include professional counseling, if such assistance is not available to the person outside of the work place, to help resolve personal problems, overcome illnesses such as drug or alcohol addiction and cope with personal tragedies.

Personal training also includes self-improvement programs such as speed-reading, creative writing or time management. Certainly formal seminars in ethics (general, business and as applied to data processing) are appropriate.

Most of the services and offerings under the heading of personal training are normally provided by the personnel or human resources development (HRD) departments. These include counseling, courses and even tuition-refund plans. An effective training plan recognizes these resources as part of the whole effort directed to helping employees function optimally in their work, to the benefit of all.

The one area in which the DP department (especially a person involved in DP training) could work effectively with the personnel or HRD department is in developing or sponsoring an existing course in the application of ethics to data processing.

4. Interpersonal. Interpersonal training relates to helping people work more effectively with others. It includes communications skills, team skills and management skills. Such training can be provided through formal classes (often offered under the sponsorship of the HRD department) or less formally in planning sessions or "bull sessions." Again, it might include tuition-refund credits for formal classes outside of the work environment.

Interpersonal training includes teaching people how to become effective trainers, how to organize proposals clearly and how to make presentations. Good interpersonal skills greatly reduce the natural frictions and tensions that arise in any work environment where there are many needs and conflicting priorities.

Every student needs training in the technical, professional, personal and interpersonal skills described above. One of the most important management skills is to learn how to recognize these needs and then to be creative in seeing how to respond to the needs.

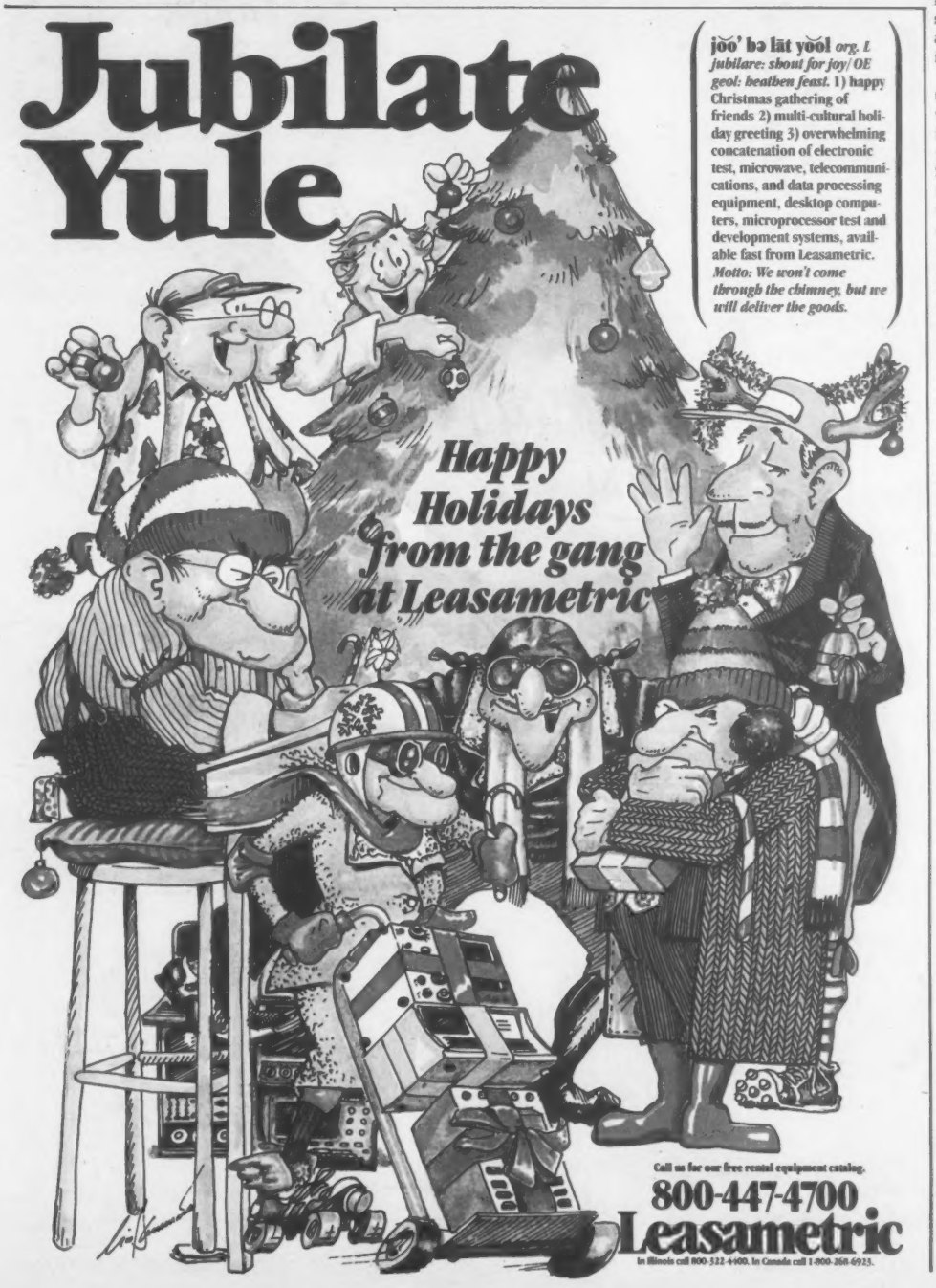
Seeking Best Solution

This leads us into the second part of this article: How can we find training that meets all these needs cost-effectively?

DP shops that are most pleased with their training programs have a mix of training sources that address differing styles and media of delivery, differing emphasis on content, differing scheduling aspects and differing cost factors. Let's look at some of these alternatives.

The most persistent fact about effective training, regardless of the kind of training (technical, professional, personal or interpersonal) and regardless of the delivery medium (lecture, audio, video, computer-assisted, case-study, self-study, technical manual, professional publication) is the need for human interaction. Nothing seems to fully replace the availability of a qualified person when it comes to getting an answer to a question or a suggestion for an experiment or some reading; testing hypotheses or conceptual understanding; restating an idea from a different perspective; or simply getting positive feedback.

The optimal source of this human resource is your own DP staff. Using



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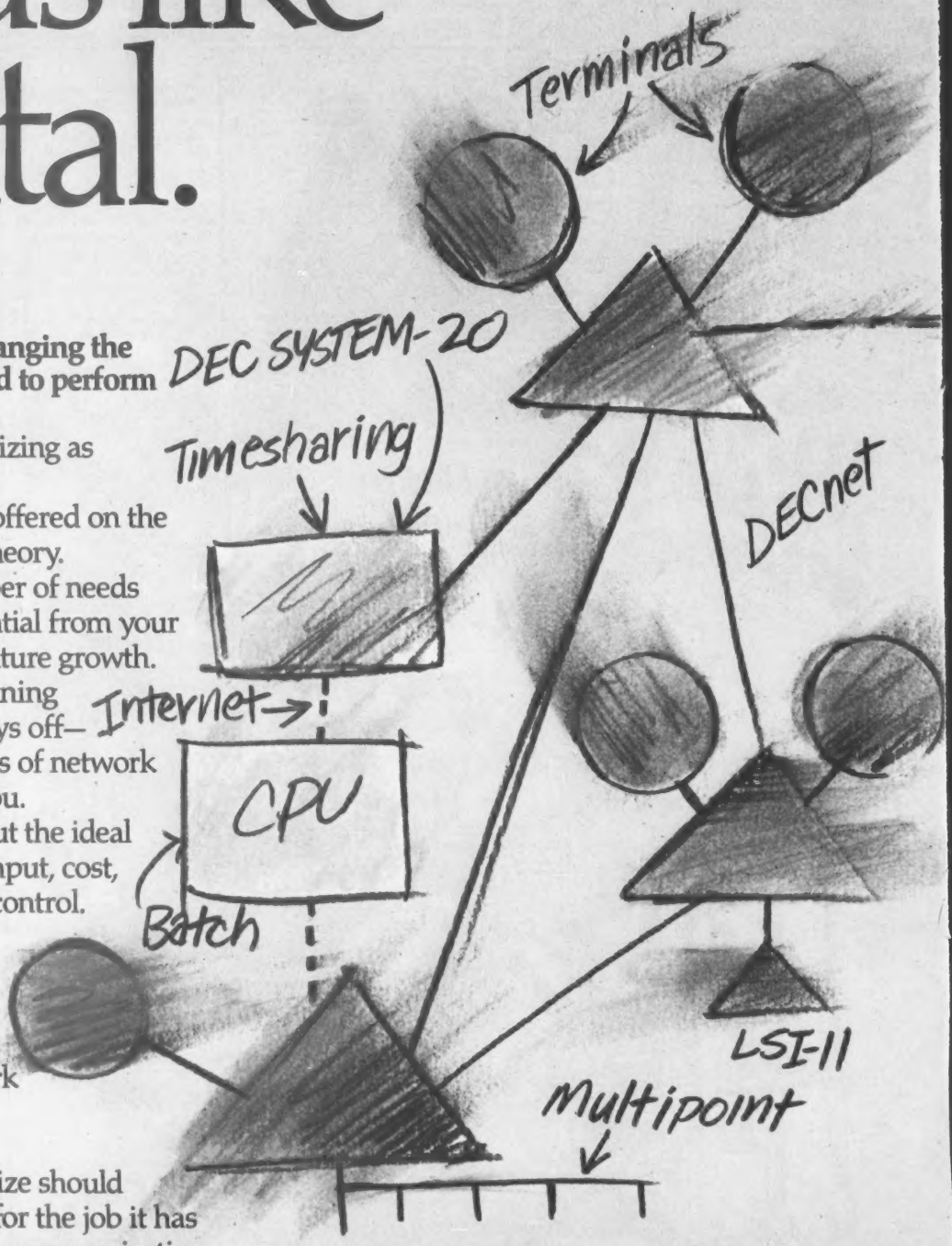

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redundancy should be planned to avoid downtime? What options are possible later for future growth?

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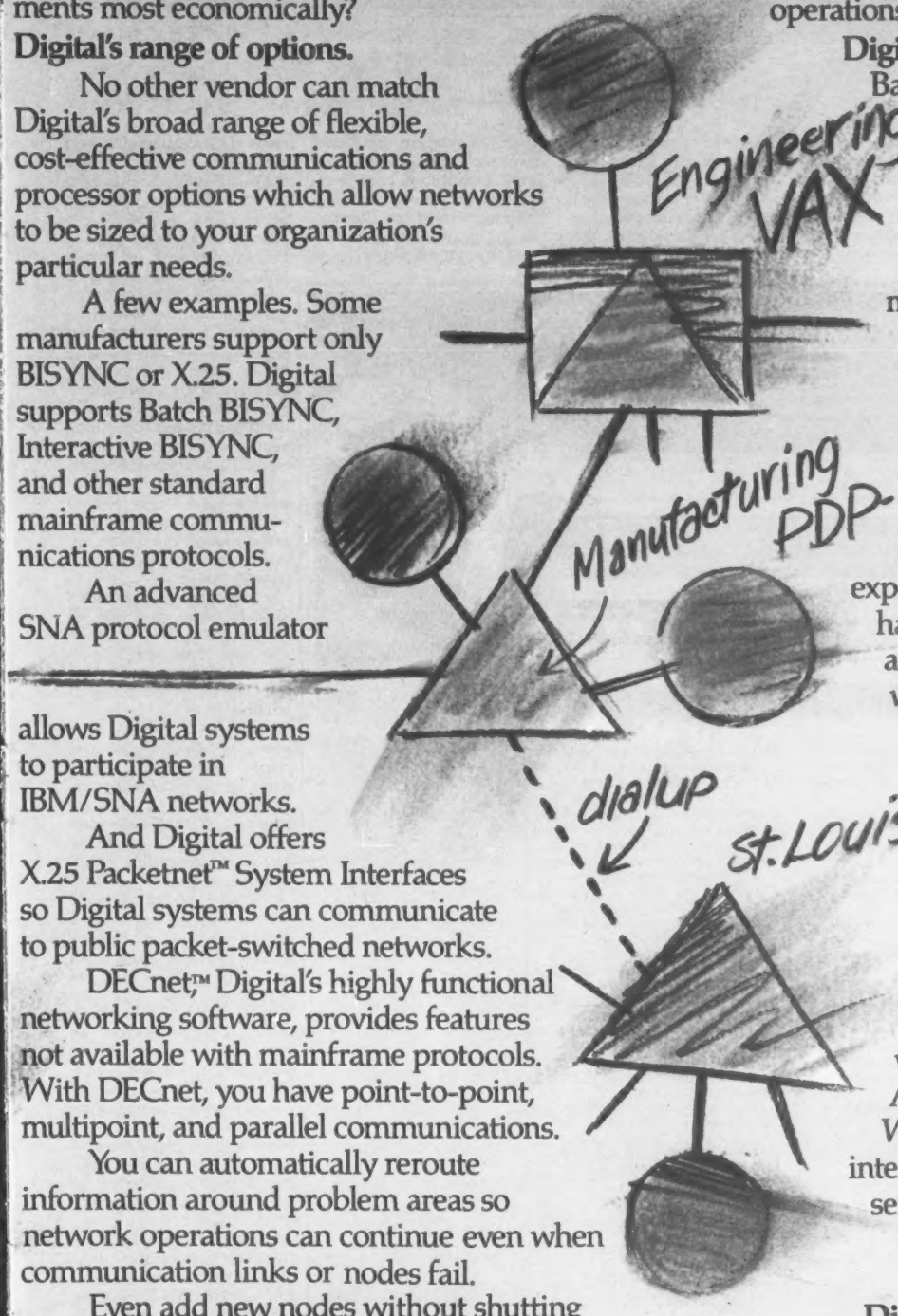

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IN DEPTH

your own people to perform, assist or support the training function has many benefits. First, the content can be tailored exactly to your needs, avoiding extraneous topics and including only local standards and procedures.

Second, getting your people involved in the training function in a way they enjoy provides a way of improving their skills as well as their students'. One can gain new insights by preparing for a class, writing a lecture or designing an exercise. Those jobs require a crystallization of one's understanding.

Another benefit of using your own people is that they gain recognition for being extremely qualified in their area. In addition, getting involved in training often provides a break from the day-to-day grind, a mini-sabbatical that allows a person to come back to the daily tasks refreshed. In large enough shops, of course, training can be a viable career option itself.

People can take part in training in any of many roles. First, most organizations need a training coordinator, or director, who is responsible for overseeing the ongoing skills inventory and needs assessment, monitoring the resulting training requirements, locating training resources and scheduling people, courses, facilities and materials as needed. For prepackaged courses, there is always a need for an adviser who can help students progress through the course, answer questions, administer tests and so on.

Prepackaged courses often need tailoring, and this job can be assigned to a person with the requisite knowledge without requiring a full-time or long-term commitment.

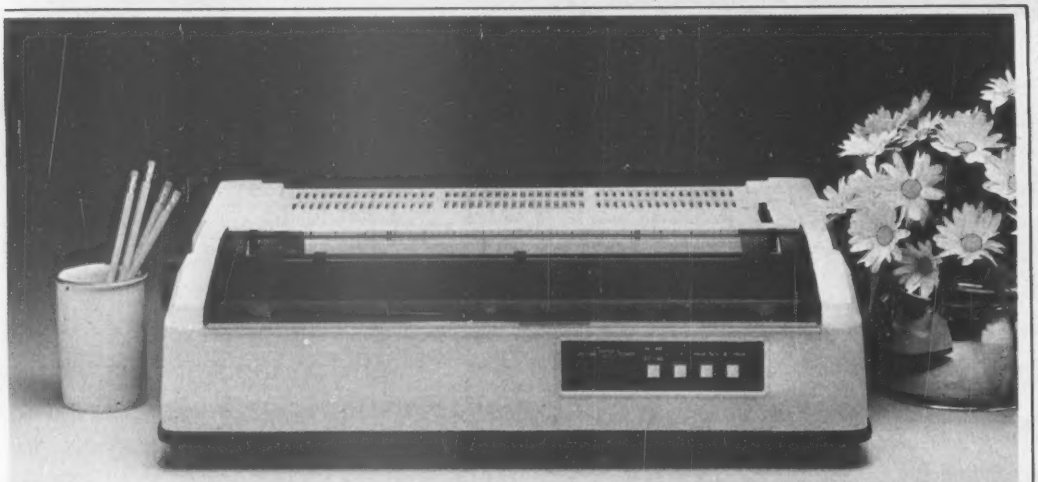
Often, an organization needs to develop its own course materials: lecture notes, artwork, student materials, computer-aided instruction (CAI) courseware and worthwhile exercises. Plenty of recognition should be given to each contributor.

Of course, asking someone to be an instructor is an obvious way to try to get him involved in the training function. But many people are not comfortable with the idea of teaching. If they have some valuable insight to share, however, they might be a guest lecturer for a seminar or act as adviser to someone developing course materials. Many companies have successful programs of peer instruction, where each individual may be called on to teach a small area or specialty.

People may also become involved in training more indirectly. They can make a valuable contribution by writing articles for in-house publications or professional or trade publications; by reporting back on courses, seminars or conferences they attended; or by serving on training committees.

Other Resources

Involving your people in both giving and getting training makes for tremendous involvement and, therefore, effectiveness. But your people cannot do it all. What other sources and styles of training are available?



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TIMELY TRAINING

IN DEPTH

Hardware vendors have been a traditional source of technical training, as well as some professional training. But they now seem to be pulling back on live training, especially workshops, to concentrate more on self-study and multimedia packages. Still, new products, or highly technical or specialized subject areas, will continue to be covered in live classes.

Software vendors are now offering more and more training in their products, some training often being included in the price of the product. In addition, some software products now come with training built into the package. For example, when you log on to an interactive system, it might ask you if you need training in how to use the system. If so, it would give you a brief tutorial on the spot.

'Four techniques can help you provide the best possible training at the least possible cost: comparison shopping, negotiating, sampling and consortium training.'

Training companies, ranging from one-person shops to the large multimedia or specialized training firms offer a wide variety of products and services. Many times they will conduct classes at your site or offer classes in their own facilities.

Look at Universities

Colleges and universities are an underutilized source of training. Some business DP installations do not have too much respect for these institutions, and there is certainly a discrepancy between what is taught and what is needed in the work place. But many colleges and universities are striving to get more in tune with the practical needs of employers. Hiring students for summer intern programs can yield big benefits, both long- and short-term, if the move is carefully planned.

Other companies are often willing to set up exchange programs, either for course materials or trainers, to help minimize redundant effort, improve overall quality and keep total costs down. This brings us to the question of how to keep all this training as effective as possible, but affordable.

The most cost-effective way to provide most training is to do it yourself if you have the people available. This includes using your DP staff to do training, but also people from your personnel/HRD department and from user departments.

As mentioned earlier, exchanging materials and people (where not legally forbidden) can keep costs down. Still, sometimes you have to look to various outside sources to provide training or training-related services. In this case, four techniques can help keep quality up and costs down: comparison shopping, negotiating, sampling and consortium training.

Comparison shopping, of course, simply means finding out what is available in

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Structured Programming Workshop	12/7-11		2/8-12					
Structured Testing		1/20-22	12/2-4 3/3-5	2/3-5				
Systems Analysis and Design Workshop		2/8-12	1/25-29	3/8-12				12/14-18
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IN DEPTH

the marketplace and then comparing the various course contents and prices. Negotiation can sometimes result in slight cost savings or minor benefits regarding payment procedures and so on (but be sensitive to the vendor's need to make a reasonable profit).

Sampling requires a willingness to try a new or unknown source of training. Many talented people or valuable services are ignored because the people who select the vendor refuse to take small risks. Because of this, excellent opportunities often are totally missed.

The small risks involved with sampling can be ameliorated even further by consortium training, which involves one company hosting an offering and allowing students from other companies to attend. The hosting company usually gets some small additional benefit. Of course, consortium training is valuable even when you are using a well-known vendor, as it allows you to hold a course locally, even if your company does not have enough students to make a minimum class size.

Training Groups

How can you become aware of all these resources? By reading the trade press, of course, and by joining professonal groups with interests in DP training. Such groups are springing up all over North America and, indeed, worldwide in recent months. These groups usually meet regularly to discuss mutual problems, to describe their special programs and to share information about resources.

In summary, training does not, by itself, cause productivity in a DP shop to increase. Nor will it necessarily improve morale or lower turnover rates. However, appropriate training in the context of proper motivation allows productivity to increase.

The process of involving everyone in both giving and getting training can help to improve morale and motivation. And organizations have several options for locating or developing other sources of cost-effective training.

In the field of data processing, there are few investments as worthwhile as a quality training program that addresses the real needs — technical, professional, personal and interpersonal — of all the people touched by data processing. Implementing such a program requires a great deal of management time, commitment and support, but it can help create an exciting, innovative environment of highly motivated and productive people.

About the Author

Steve Comstock is a free-lance instructor specializing in the area of programming for large IBM system users. He is also a technical writer and has developed courses for Advanced Systems, Inc.

Comstock has seven years' experience at IBM as a systems engineer, instructor and writer. He also taught mathematics at the University of Minnesota for two years.

He holds an M.A. in mathematics from the University of Illinois.

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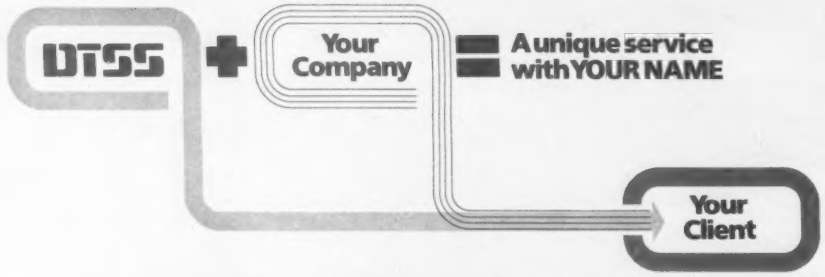

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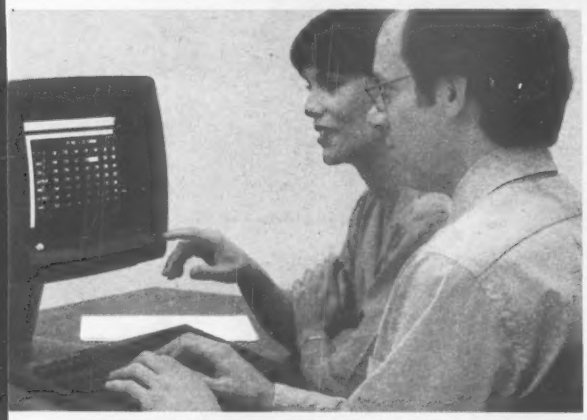
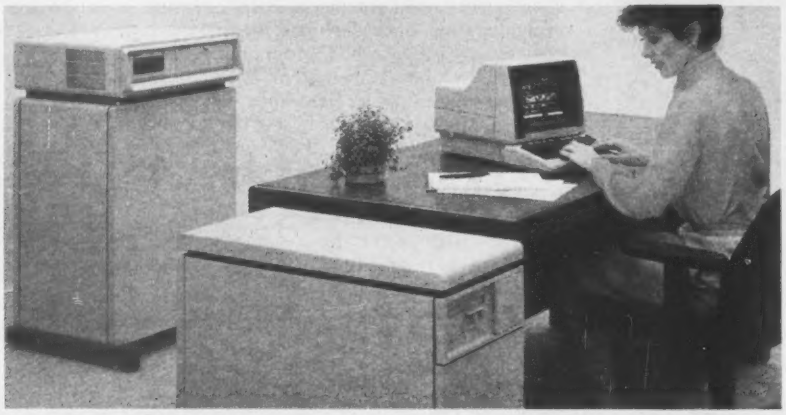
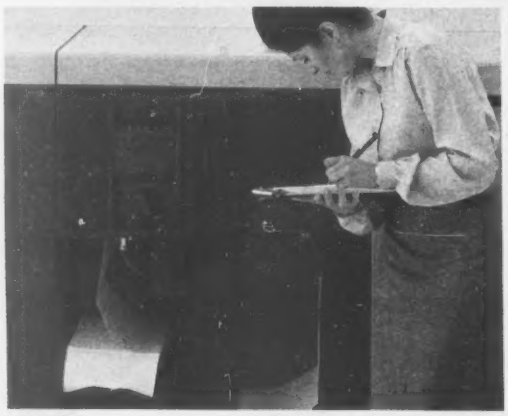


Our personal office computer, the HP 125, is specially designed to handle a manager's individual needs—including word processing, graphics, and data analysis. It communicates with big computers, too.



Economical computing with up to 56 terminals. That's what you get from the new HP 3000 Series 40. Use it as a central processor in a small office or as part of a network.

Electronic mail and filing for individual users will be part of The Interactive Office in 1982.



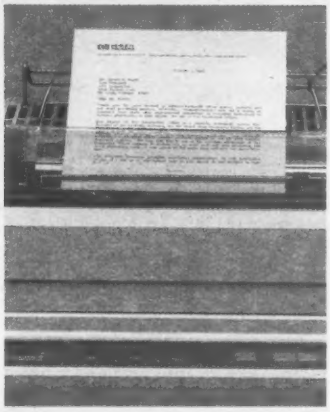
High-volume printing on this laser printing system virtually eliminates preprinted forms, letterhead stationery and long lines at the copier.

Data communications can expand The Interactive Office across the country or around the world.

tive Office.

Our new high performance HP 3000 Series 64 can handle 100 interactive users while processing big batch jobs like the company payroll.

Graphics created on this low-cost terminal can be plotted on paper or transparencies.



High-quality printing for business correspondence and reports can be generated on this letter-quality printer.

Report generation is simplified by new software tools which let business professionals create reports and summaries in minutes without programming.

Hewlett-Packard announces a major contribution to productivity in the office. It allows you to integrate the four major resources your staff needs to do their jobs faster and more effectively—document management, personal computing, support for decision making, and communications.

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If you'd like to see HP's Interactive Office at work, call your local Hewlett-Packard sales office, and we'll arrange a demonstration. You'll see what a difference it can make to your business today. And how it can grow to assure even greater productivity tomorrow.

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Los Angeles	KWHY	22	Sat	12:00 Noon
Chicago	WFLD	32	Sat	10:00 AM
San Francisco	KTSF	26	Sat	9:30 AM
San Jose	KSTS	48	Sun	4:30 PM
Philadelphia	WTAF	29	Mon	10:30 PM
Allentown, PA	WFMZ	69	Sun	6:00 PM
Boston	WLVI	56	Sat	11:30 AM
Washington, DC	WDCA	20	Sat	12:00 Noon
Dallas/Ft. Worth	KNBN	33	Tues	7:30 AM & 6:30 PM
Detroit	WXON	20	Sat	7:00 PM
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St. Louis	KDNL	30	Sun	5:30 PM

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Everyone knows that slot machines can "steal" from the unsuspecting public — that's why they call them one-arm bandits. But they can also be used to steal from their owners! Casino employees and patrons have found ways to beat the odds, and the house. Jan Holmes goes to Las Vegas to see how one slot machine manufacturer, the Bally Company, is using a computer to keep tabs on its little money makers to make sure they're playing an honest game.

Meanwhile, back in Minneapolis, The League of Women Voters has teamed up with Control Data Corporation and their PLATO computer system to tally and analyze voting information for city elections. You'll see how the system works, and how both newspapers and TV stations use it to improve their reporting.

Join us this week for another fascinating look into the world of computers and their effect on our society. The current schedule of stations and times is shown. (Be sure to check it each week, as we often change stations or times to provide broader coverage to more people.) If you don't live within range of one of our broadcast stations, you may be able to get us on cable, on "superstation" WOR, which is available in more than 5 million cable homes around the country.

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For Higher Speed Transmission

FM Radio-Based Local Nets Advocated

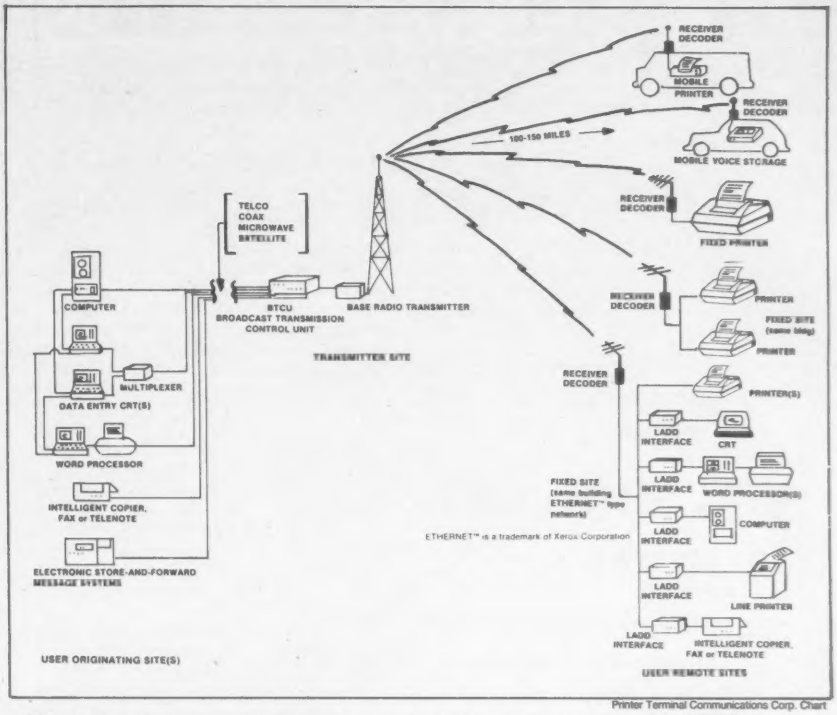
By Phil Hirsch
CW Washington Bureau

NEW YORK — Data communications networks utilizing narrow-band FM radio frequencies are another way — along with digital termination systems — to answer the growing need for higher speed digital local transmission, according to Daniel L. Gillum, president of Printer Terminal Communications Corp.

"This relatively unknown local distribution alternative provides high-speed one-way or two-way, full- or half-duplex distribution of electronic messages between central sites and fixed or mobile remote locations," Gillum explained at a recent conference here on local-area networks.

Printer Terminal Communications Corp. offers a local data communications network based on FM radio called the Local Area Data Distribution (Ladd) system. Ladd systems "piggyback onto most all VHF and UHF radio systems now in place and interface with all common computer and electronic information systems," Gillum explained.

Although the basic technology is not new, the service has been available only since 1976, when the Federal Communications Commission authorized limited digital transmission over commercial and private radio networks.



Printer Terminal Communications Corp. Chart

Shown above is an example of a local-area network that utilizes a narrow-band FM frequency.

Key Ladd Component

A system like Ladd "is totally transparent to the user," Gillum said. "It looks just like a high-speed [telephone company] link." The key component is a broadcast transmission control unit that interfaces the user's central node — typically a computer — with the Ladd network.

The control unit is generally installed within a transmitting facility — a commercial FM station, for example, or a private radio base station — and is connected to the user's computer by dedicated communications channel — microwave, coaxial cable or telephone company private line. Ladd accepts data from and delivers it to multiple users at rates of up to 9,600 bit/sec and is capable of transmitting at up to 19.2K bit/sec, Gillum said.

The system has a range of 50 to 150 miles from the transmitter; through interconnection with other, similar systems, this range can be extended indefinitely. Costs range from $25,000 to $50,000 for the broadcast transmission control unit, and $6,000 to $7,500 for each remote station, according to a spokesman.

The Los Angeles Times has reduced its home delivery service work force by 70 people as a direct result of using a Ladd system to distribute administrative information to some 200 remote sites, Gillum said. The return on investment is "greater than 50%," he added. Only quantifiable savings were included in this calculation. Officials of the *Times* "are quite aware" when intangible savings and benefits are included, the return on investment is substantially higher, Gillum reported.

Times Usage

The *Times* uses its Ladd system to distribute subscriber complaints, delivery stop/start notices, advertising supplement "stuff" notices and similar information to the paper's outlying circulation agents. Each agent is equipped with a small dot matrix printer that outputs 120 char./sec, in 80-col format and employs standard teletypewriter roll paper.

Among other benefits, the system makes it possible to distribute advertising supplements only within those areas specified by the advertiser. Gillum indicated that this feature has helped the paper sign up additional supplement advertisers.

Currently, the *Times'* Ladd system consists of 200 fixed remote sites. Next year, "a significant number of mobile stations will be added. Used by editorial personnel, each station will have a newly developed portable terminal — about 3½ in. high, 8 in. wide and 9 in. deep — that includes a scrollable, one-line, 40-char. display and a full-Ascii keyboard."

The paper's editorial personnel, Gillum said, will use these stations to send in stories. Later, the system will be expanded further to encompass subscriber news services.

"Newspapers quite often receive over one million words of news per day," Gillum explained. "Only a relatively small amount goes into print; the rest is filed in the 'morgue.' Since this news is now predominantly in electronic form at the *Times*, it can easily be distributed, via Ladd, to subscribers. The revenue and profit potential for such a service is substantial, especially since the incremental cost is negligible."

Lear Siegler Terminals, Modem Out

ANAHEIM, Calif. — Lear Siegler, Inc. has unveiled three CRT terminals and a modem.

The ADM 21 CRT terminal features full editing capabilities, function keys, conversation and block mode operation, X-ON/X-OFF and visual attributes. The terminal was said to be designed to fill the gap between the ADM 5 dumb terminal and the ADM 31 smart terminal.

It costs $695, the firm said.

The ADM 24 smart CRT terminal features a detached keyboard, protected fields, full editing capabilities, limited graphics, seven selectable international character sets, smooth or jump scroll, horizontal split screen and 80-col by 24- or 48-line display.

It costs $895, according to Lear Siegler.

The ADM 36 CRT terminal features 80- or 132-col by 24-line display, a horizontal split screen, a double-high, double-wide character presentation with limited graphics and line

(Continued on Page 68)

Micros, Mainframes Tied

SAN FRANCISCO — Micromation, Inc. has unveiled a high-speed telecommunications controller enabling a range of microcomputers to communicate with mainframes over dial-up lines.

The M/Link intelligent communications interface accommodates data transmission at 2,400 bit/sec using the Bell 201C standard and allows alternate data and voice communications. IBM Synchronous Data Link Control or Bisynchronous communications protocols are programmable read-only memory selected at the time of installation.

The interface costs $1,500 from Micromation at 1620 Montgomery St., San Francisco, Calif. 94111.

Handles Four Inputs

Modem Features Integral Multiplexer

SILVER SPRING, Md. — Rixon, Inc. has introduced its T209A modem, which features an integral multiplexer combining up to four synchronous data inputs into a composite 9,600 bit/sec output.

Multiplex combinations include four 2,400 bit/sec inputs, one 4,800- and two 2,400 bit/sec inputs, two 4,800 bit/sec inputs or one 7,200- and one 2,400 bit/sec inputs.

The microprocessor-based T209A transmits synchronous serial binary data at 9,600 bit/sec in a half- or full-duplex mode over a four-wire private line and is Bell-compatible, the vendor said.

Three front-panel locking test pushbuttons for analog loopback, digital loopback and self-test are used in conjunction with 11 front-panel LED diagnostic lamps to isolate rapidly any overall data communications system malfunction, Rixon said.

The modem is available in a stand-alone desktop enclosure that can be converted for 19-in. or 23-in. rack mounting.

The price of the modem is $6,795. Rixon is located at 2120 Industrial Pkwy., Silver Spring, Md. 20904

Terminal Board for Gandalf PACX Offers Auto/Answer for Remotes

WHEELING, Ill. — Gandalf Data, Inc. has announced a terminal board for use with the firm's Private Automatic Computer Exchange (PACX) systems.

The 135AA terminal board reportedly enables Pacx systems to provide auto/answer capabilities for remote terminals using Bell 103/113-type modems over the switched network via direct access arrangement and over dedicated lines using standard 2-wire voice grade channels.

The board can handle speeds from 0- to 300 bit/sec asynchronous at any distance over dedicated 2-wire voice grade channels and operates in the answer mode only. Each board incorporates four identical frequency shift keying modems, compatible with LDS 135 and other Bell 103/113 modems, according to the vendor. Power is supplied from the main Pacx system.

Base price for the board is $720, the vendor said. Four cables at $20 each are required for each board. Delivery is in four to six weeks from Gandalf Data at 1019 S. Noel, Wheeling, Ill. 60090.

Diablo Terminal Ties KSR to Print

HAYWARD, Calif. — Diablo Systems, Inc. is offering a keyboard send/receive (KSR) printer that combines the printing features of its 630 printers with a set of communications terminal capabilities.

The Model 630 KSR offers an RS-232C serial interface and other communications features that include 16-byte input buffer, an expanded 2,688 byte print buffer, word processing firmware features, extensive diagnostics for host control and transmission rates ranging from 110- to 9,600 bit/sec.

The device also offers 128 bytes of nonvolatile random-access memory with battery backup. It costs $2,795 from Diablo at 24500 Industrial Blvd., Hayward, Calif. 94545.

Lear Siegler Unveils Modem

(Continued from Page 67)

drawing capabilities. It also provides reverse video, reduced intensity, underline, blink and special characters.

It costs $1,195, the vendor said.

The integral modem for the ADM 32 smart terminal is a single circuit board specifically designed to mount inside the ADM 32 enclosure. It can be installed in the factory or in the field. For operation, the telephone line is plugged directly into the rear of the ADM 32 housing.

It costs $995, Lear Siegler said from 714 N. Brookhurst St., Anaheim, Calif. 92803.

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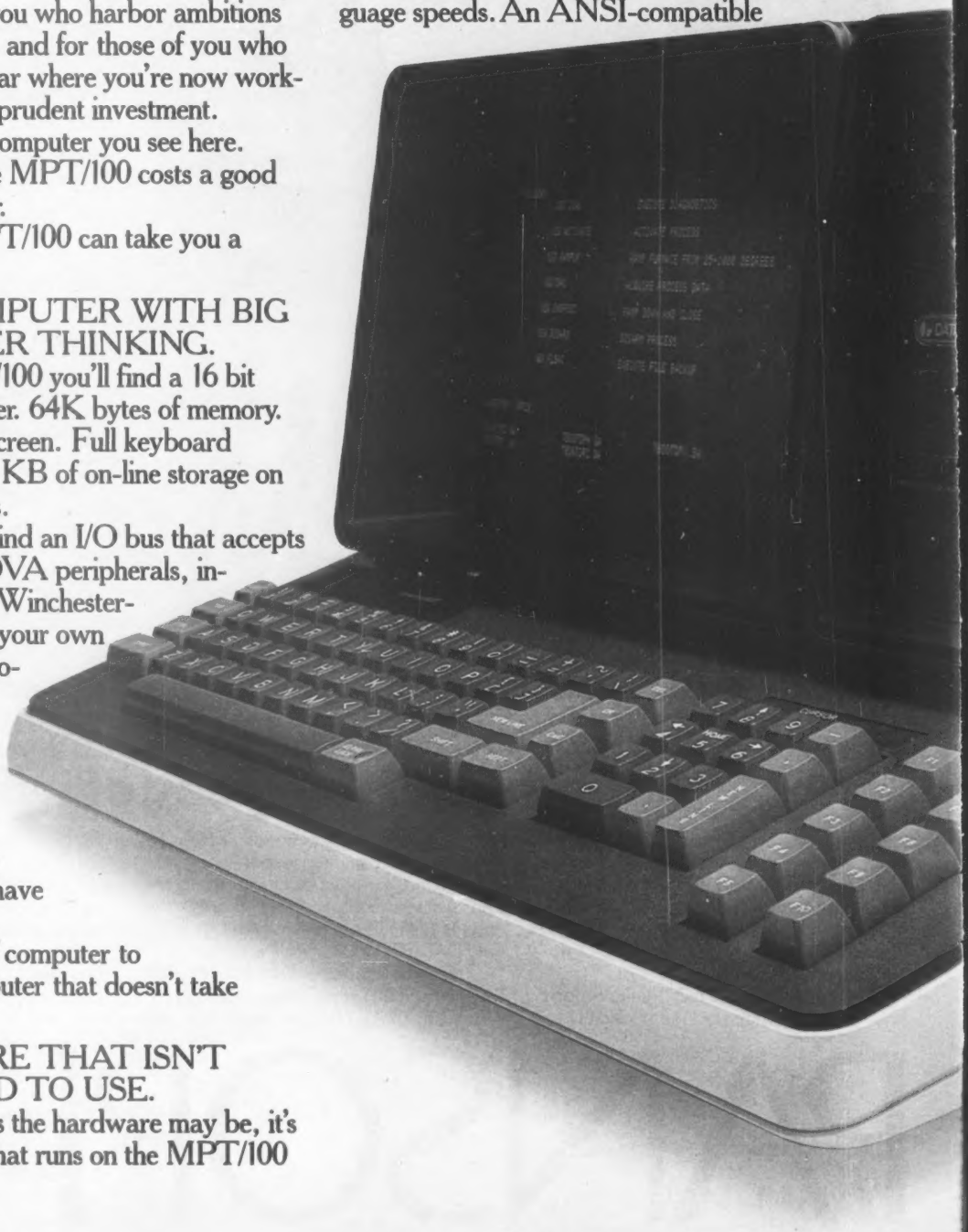

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Data Briefs

Beehive CRT Terminal Emulates IBM 3101 Models

SALT LAKE CITY, Utah — Beehive International, Inc. has introduced a CRT terminal designed to emulate the IBM 3101 Models 22 and 23.

The DM310 is said to offer both conversation and forms mode operations in one unit. The unit includes an auxiliary printer port, a 60Hz screen refresh, a 1,920-char. screen presentation with a 25th line for status information and a 3101-compatible keyboard with eight programmable function keys and 12-key numeric pad.

The DM310 costs $1,295 from 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, Utah 84125.

Portable Terminal Based On Multimicroprocessor

PARAMUS, N.J. — A multimicroprocessor-based portable terminal system running at 120 char./sec has been announced by Computer Transceiver Systems, Inc.

The Execuport 4120 features a 16-element columnar printhead, two character fonts (9 in. by 11 in. and 5 in. by 7 in.) and a choice of modems. The 4120 can operate from 300- to 9,600 bit/sec.

The terminal costs $3,295 from Computer Transceiver, P.O. Box 15, E. 66 Midland Ave., Paramus, N.J. 07652.

Computer Devices Expands Miniterm Series 2000 Line

BURLINGTON, Mass. — Computer Devices, Inc. has added a low-end, intelligent terminal to its family of Miniterm Series 2000 portable terminals.

The Model 2300, a 300-bit/sec acoustically coupled terminal, features a fill-in-the-blanks capability and 160-char./sec bidirectional thermal printer. Features include function keys, an editor/command mode, graphics option and multiple-font option.

The Model 2300 costs $1,885 or $100/mo on a one-year lease. Computer Devices is located at 25 North Ave., Burlington, Mass. 01803.

CRT Terminal Supports Systeme's Financial System

ORLANDO, Fla. — A CRT terminal designed to support Systeme Corp.'s Financial Information and Control System is available from that vendor.

The terminal features a 24 by 80 char. screen (1,920 char.), 128 displayable Ascii char., tilt and rotation capabilities and a 9-in. or 12-in. screen. It functions in local or remote environments at speeds ranging from 300 bit/sec to 19.2K bit/sec over full-duplex or half-duplex lines, the vendor said.

Screen formats, screen attributes, communications interfaces and the letter-quality printer interface are included in the terminal intelligence component.

The CRT terminal costs $3,000, Systeme said from 3443 Parkway Center Court, Orlando, Fla. 32804.

Modular System Eases Data Network Management

MINNEAPOLIS — A high-density, modular system designed to monitor, patch, test and reconfigure data networks is available from ADC Magnetic Controls Co.

Patchmate reportedly enhances data network management by monitoring data circuits without interruption, identifying down circuitry with both visual and audible alarms and providing line access on RS-232C circuits toward the terminal and communications ends of that data environment.

With LED, Patchmate costs $135, without, $65, ADC said from 4900 W. 78th St., Minneapolis, Minn. 55435.

Access/34 Offers Micros, Stand-Alone Capabilities

BURR RIDGE, Ill. — Enhancements to Sweeney Computing Corp.'s Access/34 hardware and software facility designed to enable asynchronous devices to be used as on-line data terminals reportedly have enabled the IBM System/34 to communicate interactively with the IBM Personal Computer.

This means the microcomputer may be utilized not only as a stand-alone computer, but also as an on-line interactive terminal, the vendor said. Access/34 is said to support communications with the IBM 3232 teleprinter family.

Monthly lease charges for Access/34 are $340 plus a one-time fee of $2,995. The purchase price for a minimum configuration of two I/O ports is $11,995, the vendor said from 60 Shore Drive, Burr Ridge, Ill. 60521.

Zenith Cuts Price by 10% On Z-19 CRT Terminal

GLENVIEW, Ill. — Zenith Data Systems Corp. has reduced the price of its Z-19 CRT terminal by 10% to $895, effective immediately.

Besides reducing the price by $100, Zenith has added a green, nonglare display "for which many manufacturers charge an additional $30," according to the firm. The Z-19 is compatible with the Digital Equipment Corp. VT52 computer terminal and other Ansi-standard terminals.

The unit has a 72-key keyboard, 12-key numeric keypad and features audible response with each keystroke, a spokesman said from 1000 Milwaukee Ave., Glenview, Ill. 60025.

Touch-Sensitive CRT Option Fits DEC's VT-100 Terminal

NEWTONVILLE, Mass. — Interaction Systems, Inc. is offering a touch-sensitive CRT option for the Digital Equipment Corp. VT-100 terminal.

The Model TK-2100 consists of a capacitance-sensitive faceplate, an electronic touch control and interface board, interconnecting cables and mounting hardware, the company said.

The option costs $945 with quantity discounts available from 24 Munroe St., Newtonville, Mass. 02160.

Gains Full-Service Resource

Surrey Finds Fringe Benefit With System

KINGSTON-ON-THAMES, England — In a decade-long evolutionary process, one of the largest local authorities in the UK has transformed an underutilized computer installation into a full-service DP resource.

Surrey covers an area of 650 square miles and lies to the south of the Greater London metropolitan area. With a total population of about one million, the county comprises a mixture of urban, suburban and rural communities. The Surrey County Council provides services to its citizens out of a $600 million budget.

Since 1973, the county has utilized large Sperry Univac computers, but not always to their fullest capabilities. When Roger Toms, head of computer services for the council, assumed his post in 1976, the Univac 1106 computer was being used almost exclusively for financial applications.

"That fact that the system had the capability to help all departments in the county government wasn't fully appreciated at the time," Toms said. "But we have made considerable progress since then to the point that our group is now recognized to be a full service organization committed to help all departments.

"Our guiding policy has been to make the computer's capabilities available to helping people in the day-to-day performance of their jobs," Toms added, although that was not always the case.

It was not until 1978 that the 1106 became "too small for our needs," according to Toms, at which time the county took delivery of an 1100/21 system. At that time, services to all departments began rapidly increasing and soon it became apparent that an even larger system was needed.

In December 1979 an entry-level 1100/80 system was delivered, later upgraded to the present dual 1100/81 systems. Computer equipment now on hand is valued at about $9.8 million and comprises one of the largest computer complexes of any county government in the UK.

In top photo, Roger Toms (right) head of computer services at Surrey County Council, discusses the work schedule with Peter Kish, operations controller, at the computer center at County Hall. In bottom photo, Mike Wells, project manager at Highways House, home of the County Highways Department's DP center, loads a disk onto a Univac V77/600 minicomputer linked to the Surrey County Council's 1100/82.

Offerings to Users

What exactly does the county offer and to whom? One user is the Highway Engineering Department, which in 1976 was using an outside service bureau at an annual cost of $245,000.

"This year they are doing the bulk of their work on our machine and the outside expense has been cut to around $26,000," Toms said. "Our program development work has also resulted in a structure register system for the engineers which has on file all bridges, aqueducts and other structures within the county that are required to be inspected at regular intervals.

"The system automatically alerts the engineers when inspections are due," Toms explained, adding, "We've also helped engineering by developing a number of systems that can be used in road construction work."

A program for reporting traffic accidents and spotlighting those locations having a high frequency of accidents has been produced by computer services as part of the promotion of better road safety on Surrey highways. About 6,000 accidents are analyzed annually by this program, Toms said.

Education is the largest individual function of the Surrey County government, absorbing about 60% of all expenditures. As might be expected, the Education Department is a major user of computer services and has five Uniscope 200 terminals tied

(Continued on Page 75)

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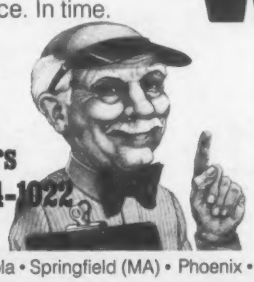

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HP Reduces Laser Printer by 19%

BOISE, Idaho — Hewlett-Packard Co. has reduced the list price and monthly maintenance charges for its HP 2680 laser printing system. In the U.S. the vendor has reduced by 19% the list price of the system to $98,500 from $121,000.

Depending on usage levels, monthly maintenance has been reduced between 46% and 52%. At a 300,000 page/mo level, the new maintenance charge is $1,935 — down from $3,596. At the 600,000 page/mo level, the maintenance cost is now $3,255 compared to the former price of $6,746, HP said.

Users will save between 34% and 42% of the total cost of the system under the new pricing structure.

HP attributed the reduction in cost of the system to improvements in manufacturing productivity and said the reduction in maintenance was due to the reliability performance of the product. The printer is available from HP at 11311 Chinden Blvd., Boise, Idaho 83707.

Intelligent Printer Features Ballistic Print Head

NASHUA, N.H. — An intelligent computer printer that uses a ballistic print head for labeling, bar code and variable-size character printing has been unveiled by Dataroyal, Inc.

The IPS-7000-A incorporates many of the same features as its predecessor, the IPS-7000. However, the "A" unit has a newly designed print head and can print shipping labels in different formats on a variety of materials, includes three Code 39 alphanumeric and seven selectable standard bar codes and can print variable-size matrix characters. The 132-col serial impact printer comes with parallel, RS-232C serial and 20mA current loop interfaces, a spokesman said.

The IPS-7000-A bidirectionally prints a 64-char. set in the standard U.S. Ascii mode; Danish, German, Swedish/Finnish, Spanish and UK sets are optional. It can also handle forms lengths up to 12 in. through a rear or optional bottom paper feed, the spokesman continued.

The intelligent printer has transmission speeds of 300- to 4,800 bit/sec, selectable 6 or 10 line/in., a self-test and audible trouble alarm.

Finally, the IPS-7000-A has a programmable vertical format and a dynamic platen with adjustable print density. It can also print multipart forms up to an original plus five copies.

The IPS-7000-A costs $3,080. However, conversion kits for current IPS-7000 users, which include the new ballistic print head, driver board and connecting cable, sell for $250.

Dataroyal is located at 235 Main Dunstable Road, Nashua, N.H. 03060.

Surrey Finds Fringes

(Continued from Page 73)

into the 1100/81 system.

Three colleges in the county have data communications lines linking them to the 1100/81 system for supporting student instruction programs in computer operation and computer languages.

The Technical College at Brooklands has five Uniscope 200s and one DCT 1000 terminal; the Redhill Technical College has two Uniscope 200 units and one DCT 1000 terminal and the Northeast Surrey College operates a V77-600 minicomputer. Special programs have been developed for school scheduling and a careers advisory service.

Social services is another large user of computer resources. "We have just gone live with the first stage of a social services information system that will keep records on the services provided by the county to residents of all ages," Toms noted.

The program includes the provision of residential care for 600 children, 2,200 elderly persons and about 300 retarded and disturbed children, services for handicapped and blind people and home help services for the elderly, sick and disabled and maternity cases.

The Surrey Univac system has main memory storage of one million words, an 8,000-word high-speed cache memory, six Univac 8434 and six 8433 dual-density disk drives providing a total capacity of 533 million words of mass storage, eight Uniservo 20 magnetic tape drives, two high-speed printers, a card reader and a general communications subsystem with 32 ports.

Linked to the central processor are about 80 terminals including 48 Univac Uniscope 200 and 15 UTS 400 visual displays, two DCT 1000 terminals and two Univac V77-600 minicomputers.

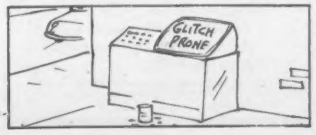
The communications network has 22 external remote lines entering the 1100/81 system. The data links are a mixture of 9,600-, 4,800-, 2,400- and 600-bit/sec speeds.

Series of Switchers Out for 8-In. Drives

ANAHEIM, Calif. — National Power Technology has announced a series of 150-watt open-frame switching power supplies designed for use with 8-in. Winchester drives.

The NW150 switchers feature 24V main output capability with post-regulated auxiliary outputs in an industry-standard outline configuration, according to the vendor.

Quantities from one to nine cost $292 each; quantities from 100 to 249 cost $216 each from the firm at 2111 Howell Ave., Anaheim, Calif. 92806.



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Turnkey Integrates Retrieval, Micrographics Storage; Fits Nova

NEW YORK — MML Computers, a subsidiary of Metropolitan Microforms Ltd., has introduced a turnkey management information system (MIS) that ties together micrographics storage and computer-assisted retrieval into a single package.

The Micrographics Computer-Assisted Retrieval system consists of a computer-controlled Minolta Corp. planetary camera with optical bliping, digital roll and frame locations, automatic focusing and an 11-in. by 14-in. copy board. The unit's 16-bit computer accepts random data and indexing techniques that are said to allow for fast search and retrieval to exact microfilmed roll and frame locations.

The computer hardware consists of a 400 nsec minicomputer that can handle up to 64 simultaneous users. The unit is RS-232C-compatible, contains hardware and software remote and local diagnostics, Control Data Corp. disk drives and a battery backup. The system is compatible with Data General Corp. Nova and Nova-type controllers.

The price of the firm's computer starts at $16,995. However, the cost of a total system, including the camera, a reader/printer with intelligent keyboard, CRT terminal, line printer, workstations and software, ranges from $29,550 to $55,000.

MML is located at 76 Madison Ave., New York, N.Y. 10016.

Enhanced Vision One/10 Includes Real-Time Zoom

ALTADENA, Calif. — Comtal Corp. has announced an enhanced version of its image processing system, Vision One/10.

Vision One/10-M6 tabletop system can operate in a stand-alone mode or can be attached to a host processor. Enhancements include real-time zoom and roam facilities, as well as pseudocolor processing and contrast stretching techniques, the vendor explained.

The operating system is included as a standard feature and a basic system includes memory control logic, pipeline processors, power supplies and a host processor, according to Comtal Corp.

Applications include analysis of National Aeronautics and Space Administration's Landsat satellite data and other remotely sensed data, as well as X-ray enhancement, according to the vendor.

A single Vision One/10-M6 costs $33,250, the vendor said from 505 W. Woodbury Road, Altadena, Calif. 91001.

Label Printer Fits IBM 3270s, 4300s, 8100s

ANN ARBOR, Mich. — Interface Systems, Inc. has introduced an IBM 3270-compatible label printer for IBM 4300 and 8100 processors that can print alphanumeric characters up to 1.4 in. in height.

The PR-300 printer plugs into IBM 3274 and 3276 control units and operates with IBM computers using that firm's serial biphase coaxial protocol.

The printer incorporates Printronix, Inc.'s P300 printer mechanism and offers users the benefits of IBM's program symbols feature without the programming time and expense to support it, a spokesman said.

Escape Sequence

The unit operates automatically through the existing IBM 3270 applications program using a four-digit escape sequence, according to the spokesman.

The PR-300 can run in local or remote environments and supports bisynchronous or SDLC-SNA communications.

The unit costs $9,750 and can be shipped in 90 days from the firm at 462 Jackson Plaza, Ann Arbor, Mich. 48103.

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Registration for the four-day conference and exposition (January 12-15), including daily lunch and beverages in the exhibit area, is $395 until December 7 (then $445). It includes a special EXTRA: 15 sessions on electronic mail and office communications (EM/OC).

Admission to the EM/OC series only (January 14-15) is $245.

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Floppy Allows Exchanges Between Different Systems

MENLO PARK, Calif. — Instor Corp. has introduced an intelligent floppy disk storage system that is said to allow data exchanges between different data processing, word processing, data entry and data capture systems.

The Instor/80 consists of an IBM 3741 format diskette that can be connected to any computer system using an RS-232C asynchronous communications port. The unit allows an interface to any implementation of the RS-232C protocol, a spokesman said.

When the disk system is used with a processor, an optional interfacing program is loaded from the drive. However, when used in data capture and data entry applications, no program is required. The Instor/80 reportedly handles the Ascii to Ebcdic conversion and all other requirements for the IBM format, the spokesman noted.

Currently, the drive is geared to fit more than 25 different computers, including IBM's recently introduced personal computer. Other systems include those from such vendors as Hewlett-Packard Co., Prime Computer, Inc., Data General Corp. and Digital Equipment Corp. The system can also be used with optical character recognition page readers, scanners and bar code readers.

The Instor/80 costs $3,000. Optional interface programs are available for an additional $1,000 from the firm at 175 Jefferson Drive, Menlo Park, Calif. 94025.

System Joins Adds Family For Business

HAUPPAUGE, N.Y. — Applied Digital Data Systems, Inc. (Adds) has added a new system to its Multivision small business system family.

The Multivision 2 Model 8-5 contains 800K bytes of floppy disk storage and 5M bytes of 5¼-in. hard disk storage combined in a single unit.

The Model 8-5 can also be expanded. With the addition of a multiuser box, the system becomes a Multivision 3 Model 8-5, capable of handling up to four simultaneous users. The growth to the larger system requires no software conversion and no hardware changes other than the additional unit, an Adds spokesman said.

The Multivision 2 was designed for users who have applications requirements more powerful than those they can run on Multivision 1, but who are not yet ready for Multivision 3, according to the firm.

Available in the second quarter of 1982, the Multivision 2 is priced at $5,995. The multiuser Multivision 3 is priced at $8,495.

Adds said the the original Multivision system is still in production and all software is transferable between systems. The firm is located at 100 Marcus Blvd., Hauppauge, New York 11787.

Tom Gregg and Lauren Bailey, system operator, go over data displayed on the IBM Datamaster, which is used to audit freight bills for Gregg's clients.

Two IBM Datamasters Help Small Freight Firm Tote Heavy Billing Load

Special to CW

DETROIT — As president and founder of a five-employee transportation management and consulting firm, Tom Gregg is not exactly a mover and shaker in worldwide commerce circles.

However, using two IBM computers that track billing and sales activities for various freight companies, he does play a small but important role in materials shipping.

A freight company's profits are based on what materials are shipped, how much they weigh and how far they are going. Rates and shipping fees are set by the Interstate Commerce Commission.

By law, motor freight companies must collect their charges within seven days or, in the case of railroads, 96 hours. Unfortunately, it is often difficult for a common carrier to bill a customer and then receive payment within the prescribed period.

What usually happens is that a past-due notice is sent by the carrier if the bill is not paid on time. And sometimes multiple past-due notices are received for the same freight bill, Gregg said. That is where Gregg's company and his two IBM Datamaster computers come in.

Industrial Transportation's computers are used to scan for duplicate billing input and reject those bills that have already been processed and paid. Customers that sign up with Gregg's company are assigned account numbers and given a file that indicates the shipper or vendor name, to whom the shipment is being sent and the carrier freight bill number.

"At this point, we use the computer to see if the bill has been previously processed," Gregg stated.

Bills are identified in the computer according to an industry-accepted standard carrier alpha code (Scac) and the carrier's freight bill number. When those details are entered, the computers search the files and print the previous payment record, if any, of that freight bill.

(Continued on Page 79)

Point 4's Mark Processors Gain Cache and Winchester

IRVINE, Calif. — Point 4 Data Corp. has introduced two products for its Mark line of computers: a cache memory that is said to increase system throughput by as much as 100% and a Winchester disk-based subsystem that provides up to 20M bytes of formatted storage.

The Lotus cache memory is made up of 64K-bit chips arranged on a four-layer circuit board. The memory comes in four sizes — 128K-, 256K-, 512K- and 1M bytes — and plugs directly into the backplane of the firm's Mark 5 or Mark 8 computers.

The memory provides block storage of data and direct memory access transfers using either high-speed or standard data channels. Multiple Lotus boards can be used to provide up to 64M bytes of random-access storage, a spokesman said.

The primary advantage of the cache memory is that it reduces the overhead inherent in data transfers to and from disk memory devices. The memory operates in a block mode. Single blocks of data — about 256 words long — are transferred for each command sequence.

The unit also includes an optional error detection and correction capability and will eventually have a battery backup power pack. Prices range from $3,490 for the 128K-byte version to $9,600 for the 1M-byte memory.

Point 4's peripheral subsystem provides a way to integrate an 8-in. Winchester disk and a disk backup device in a standard 19-in. rack with the firm's Mark, Mark 5 and Mark 8 computers.

The subsystem is offered in two versions: One provides a Control Data Corp. Lark disk, which offers 8M bytes of fixed data storage and 8M bytes of storage on a removable disk cartridge for backup. The other features an 8-in. Basf Corp. drive, which has a 20M-byte capacity and a streaming tape cartridge for data backup.

The 8M-byte system costs $6,965 while the 20M-byte version sells for $7,990.

Additional information can be obtained from the firm at 2569 McCabe Way, Irvine, Calif. 92714.

CPU With 14-In. Winchester Extends DG Enterprise Line

WESTBORO, Mass. — Data General Corp. has expanded its Enterprise line of desktop computers by adding a second model that features a 14-in. Winchester disk drive.

The Enterprise 3000 offers the same hardware, operating system software and capabilities as the Model 1000, which kicked off the family last June.

Like its predecessor, the 3000 has a Micronova-based CPU with 64K bytes of memory; a double-sided, dual-density floppy diskette with 716K bytes of storage; a CRT terminal; keyboard; and a 150 char./sec commercial-quality printer. However, the latest system includes DG's Model 6102 hard disk that offers 12.5M bytes of storage, a data transfer rate of 910,600 byte/sec and a rotational speed of 2,964 rev/min, a spokesman said.

The Enterprise 3000 costs $13,995. However, the Model 1000 — which sells for about $7,195 — can be upgraded to the later version for the price of DG's hard disk.

Additional information on the system and upgrades can be obtained from DG at Rt. 9, Westboro, Mass. 01581.

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Mini Bits

LS525 Fits Tandy TRS-80

SANTA CLARA, Calif. — An intelligent mass data storage system for use with the Tandy Corp. Radio Shack TRS-80 Models I and II has been announced by Laredo Systems, Inc.

The LS525, occupying less than .5 cubic feet of space, reportedly stores 5M bytes of on-line data — said to be 31 times more than standard floppies. The unit uses the LDOS Disk Operating System, permitting linking, routing, setting and filtering.

The unit costs less than $3,500 from 2264 Calle de Luna, Santa Clara, Calif. 95050.

Micro Incorporates 210

CAMBELL, Calif. — Data Terminals and Communications, Inc. has announced the DTC Micro 210B, an Intel Corp. 8085-based microcomputer that uses the firm's DTC Micro 210 Winchester disk drive.

Each Micro 210B incorporates two 5½-in. floppy disk drives that store 300K bytes of data, 64K bytes of random-access memory and a 10M-byte Winchester disk drive. An extra 10M-byte Winchester drive can be added to expand hard disk storage to 20M bytes, the vendor said.

Systems start at $7,000, the vendor said from 590 Division St., Cambell, Calif. 95008.

Qume Offers Floppy Disk

SAN JOSE, Calif. — A double-sided, double-density 5¼-in. floppy disk drive capable of recording at 96 track/in. has been announced by Qume Corp.

The Quietrak 592 reportedly has a capacity of 1,000K bytes formatted or up to 819K bytes unformatted and a track-to-track access time of 3 msec.

The Q592 costs $465 from the vendor at 2350 Qume Drive, San Jose, Calif. 95131.

CPUs Help Freight Firm

(Continued from Page 77)

"If there is no such record, we can then enter that freight bill for immediate payment," according to Gregg.

At the same time, the computers update the files. Next, the charges are determined and if the rate is correct, the bill is processed for payment. If not, the rate is adjusted to reflect the proper payment due.

The bottom line is that Gregg's freight customers get their payments within the government-set time.

Before turning over his business totally to computers, Gregg's invoices had to be checked by hand and then turned over to a service bureau for batch processing. This operation proved both troublesome and expensive.

"We couldn't deviate from the batch processing program system unless a major reprogramming change was involved," Gregg observed. Even then, "what would come back was something like I wanted, but not exactly what I wanted," he said. And it often took two to three months to complete.

Early last fall, Gregg purchased an IBM 5120 computer system, which he used until last August when he bought the Datamaster system. The 5120 system was leased to one of Gregg's customers.

What took Gregg's company 15 hours to do with the service bureau, the Datamaster reportedly does in about five minutes.

Rather than move on to a larger computer system, Gregg recently bought a second Datamaster and uses both machines to handle his growing business.

He also uses one of the machines in his capacity as a district sales manager for a container ship line. The company ships materials all over the world and he has the computer programmed to provide various sales activity reports.

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Audible Key Click	STD	STD
Non Volatile Set-up Modes, "Menu" Style	STD	NO
25 Status Line	STD	STD
Split Screen	STD	STD
Line Drawing Character Set	STD	STD
Block Graphics	STD	NO
Sculptured Keycaps, Matted for Low Glare	STD	NO
Paging	OPT-8 Pgs.	OPT-4 Pgs.
Full Editing	STD	STD
Programmable Non Volatile Columnar Tabbing	STD	NO
Choice of Typomatic/Non Typomatic Keyboard	STD	NO
14" Screen	OPT	NO
Independent Xmit/Receive Rates	OPT	NO
N-Key Rollover	STD	NO
CR New Line Mode	STD	NO
Foreign Character Sets	OPT	NO
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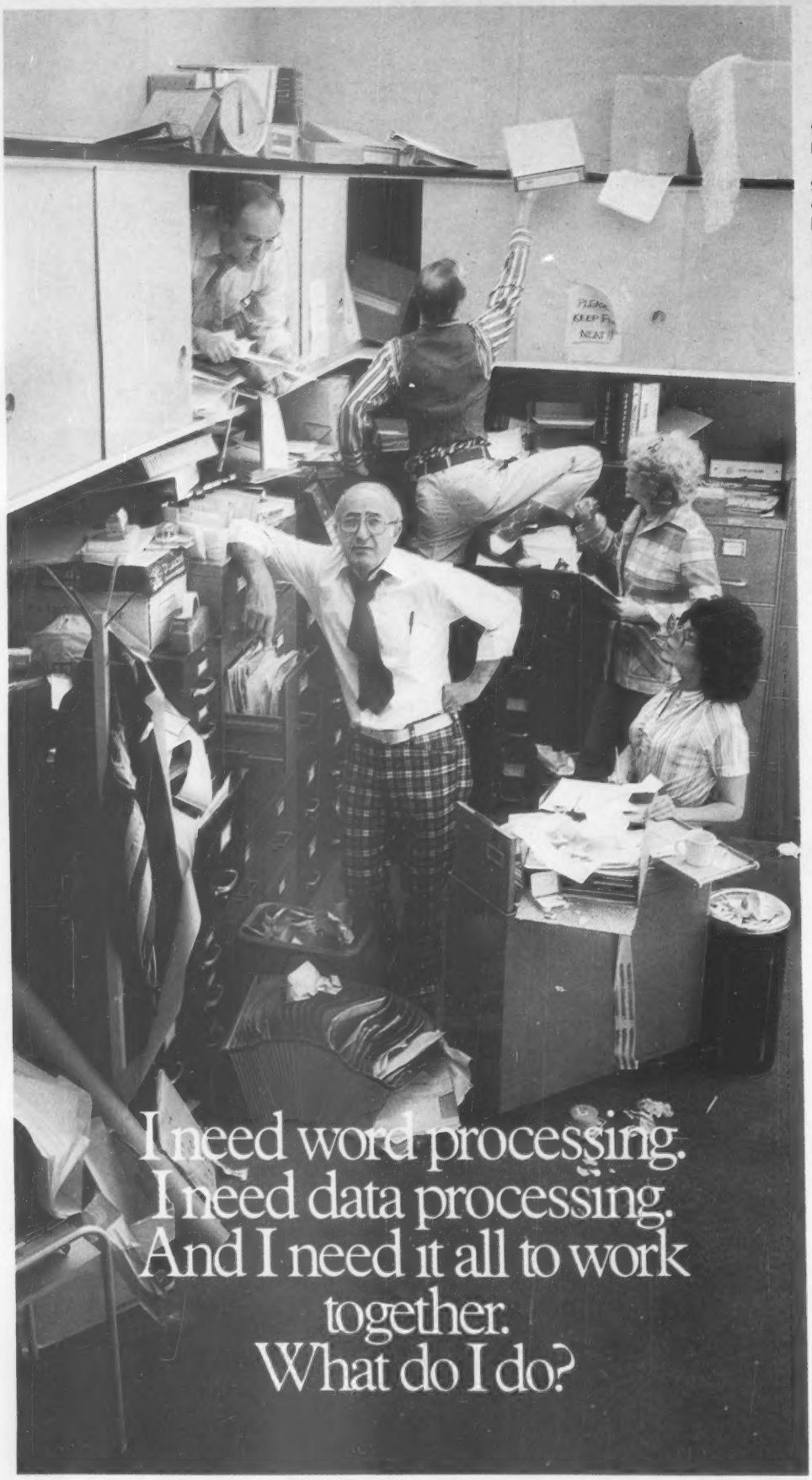

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Honeywell

Executives Give Answers

Question: Are OA Managers Technicians?

By Bruce Hoard
CW Staff

Check one:
The office automation manager

_____ will
_____ will not

be a technical person.

If you checked the "will" answer, you are correct, according to Thomas Tenhunfeld, vice-president of Corporate Communication Sciences, Inc.

If your answer was "will not," go to the head of Dr. Harvey Freeman's class. Freeman is vice-president of architecture at Architecture Technology Corp.

Tenhunfeld said "I don't see any way that can be avoided," when asked if office automation managers will have to come from technical backgrounds. He maintained that situation will hold true for the next five to seven years because office automation technology is still too new for most companies to have acquired in-house expertise to deal with it.

In his opinion, nontechnical people just do not have the know-how to "assemble and assimilate" the office of the future.

He did allow that the situation is changing faster in big companies than in small ones because they have the money for staff. "But if you're not Exxon Corp., General Electric Co. or Standard Oil Co., your opportunities for creating a staff to pull that all together are much more restrictive," he declared.

Tenhunfeld is not sure just who this nascent office automation manager is. He feels such people are frequently trained within the sales and customer service groups of word processor and minicomputer vendors.

In the case of smaller operations, he said, the technically oriented office automation manager may find it difficult to deal with people as well as technology.

Freeman directly contradicted Tenhunfeld's assertion that the office automation manager will have a strong technical background.

"I don't believe that," he said. "Especially for small companies. They will never acquire that in-house expertise because they can't afford it."

Small companies will get around the technology gap by acquiring software specifically written to manage small business needs, the vice-president claimed, adding he has a friend who has been writing such software for the past six months.

He admitted user-friendly, nontechnical programs have a tendency to consume excessive memory space, of which there is precious little in the microcomputers favored by many small businesses.

He advocated resource sharing among small businesses as one way to beat the memory shortage.

In addition, he noted, plummeting hardware costs are making more memory available for less money.

Freeman expressed concern over the idea of individual word processing and minicomputer vendors acting as trainers for office automation managers. The problem is individual companies have proprietary products and to know one company's offerings is not necessarily to know another's, he commented.

The office automation manager of the future will be the same person as the office manager of today, he said.

Xerox Brings Out Memorywriters For Ethernet Users

NEW YORK — Communicating typewriters capable of hooking up to the Ethernet network were introduced by Xerox Corp. here recently.

Part of a family of typewriters called the Memorywriters, the Models 620 and 625 utilize a Teletype mode of communication and will be able to access Ethernet through the Xerox 872 and 873 communications servers, the company said. They will operate at a rate of between 300 and 1,200 bit/sec.

Xerox' basic model Memorywriter is the Model 610 and includes 250 char. of memory for keystroke storage, automatic erasing and 946 char. for phrase and format recall. It also includes automatic carrier return, automatic indent, bold print, centering, decimal tab alignment, phrase recall, go-to-end, right flush, automatic underline and reverse.

The Model 615 has all the basic features with 180 char. for keystroke storage and 5,450 char. for phrase format and page recall. In addition, it offers stored automatic stop, clear, go-to-start, justify, replay, underline, typo correct and phrase recall by abbreviations.

The 620 Memorywriter adds a 20 char. display to the features of the two lower models in addition to its communications option. Memory of 9,400 char. for phrase format and page and document recall is also included as well as automatic find, automatic forms layout, hyphen scan, delete forward/reverse and recall by document name.

The Model 625 substitutes a 19K-char. memory for the 9,400-char. memory of the Model 620, Xerox noted.

Xerox said the Memorywriter series will be available through both the Business Systems Group and the Office Products Division of the company. The Model 610 is priced at $1,430 and will be available in the first quarter of 1982. Prices for the other models were not available. The communicating Models 620 and 625 will be available in June, Xerox said.

More information can be obtained by contacting the Xerox Business Systems Group in Rochester, N.Y., or the Office Products Division in Dallas, Texas.

MDS Series 21 Gets WP Software

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) has added word processing software for its Series 21 distributed processing systems.

Word 21 can be used by personnel with no DP knowledge, MDS said. It provides rapid entry, formatting and correction and composition of text.

The software features a set of arithmetic calculation capabilities for use with various financial and other business reports. Other features reportedly include right-hand text justification, global search and replacement of text elements within the document, the ability to search and locate stored documents by key words and the ability to print from the screen.

The software license costs $1,200 on perpetual lease or $60/mo, MDS said from Seven Century Drive, Parsippany, N.J. 07054.

Time Monitor Fits IBM 3732 WP Net

HANOVER, N.H. — DTSS, Inc. has unveiled a response time monitor designed to boost terminal operator productivity in IBM 3732 word processing networks by identifying unsatisfactory system performance.

The Tempo 32 attaches to the 3732 terminal and intercepts signals passing between the keyboard and host computer, the vendor said. Based on those signals, Tempo measures the response time — the time that elapses from the pressing of any enter-related key at the terminal until the host computer unlocks the keyboard and makes it available for the next transaction.

The individual response time measurements, as well as summaries of groups of response times, are reported on a small strip printer attached to the Tempo unit.

The unit costs $2,450 with printer from DTSS at 10 Allen St., Hanover, N.H. 03755.

Office Connection '82 Set for February

NEW YORK — Office Connection '82, sponsored by Auerbach Publishers, Inc., will be held at the Vista International Hotel (Hilton) here on Feb. 23.

Dr. James H. Carlisle, president of Office of the Future, Inc., will be the keynote speaker on the topic, "Strategic Planning for Office Automation." Four workshops will examine the pros and cons of four issues: word processing management, communications, integrating word processing and data processing and office automation productivity.

Registration is $110 for subscribers to Auerbach's *Electronic Office* and $160 for nonsubscribers. Auerbach is located at 6560 N. Park Drive, Pennsauken, N.J. 08109.

Publication Focuses on WP Products

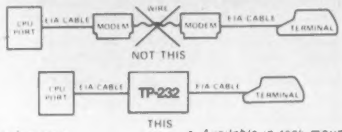
CHERRY HILL, N.J. — Management Information Corp. (MIC) is offering a four-volume Officemation Subscription Service. It reportedly provides detailed evaluations of office automation products as well as techniques on selecting products, organizing the office and performing cost analysis.

The Officemation Product Reports section provides evaluations of such systems as the IBM 8100, AES/Lanier Business Products, Nixdorf Computer Corp. 8845, Xerox Corp. Star, IBM Displaywriter, Burroughs Corp. III Series, Wang Laboratories, Inc. Wangwriter and Compucorp Omega, the firm said.

Also included are 30 office automation product evaluations, which may be bought separately from the subscription for $95 each. The subscription service costs $445, MIC said from 140 Barclay Center, Cherry Hill, N.J. 08034

TP-232 MODEM SIMULATOR

The TP-232 Modem Simulator replaces a pair of modems in local, in-house applications, as shown below. With its wide variety of strap selectable options, this unit is a versatile tool for system check-out as well as an economical replacement for a modem pair.



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Version 2 of 'Messenger' Available for Local Nets

PALO ALTO, Calif. — Version 2 of the Messenger interoffice electronic mail and message system for Nestar Systems, Inc.'s Cluster/One Model A local-area network is available from Nestar.

With Messenger, the commands SEND, ANSWER and FORWARD provide the user a complete set of options necessary to communicate quickly with one or more persons on the system, the vendor said.

The NEWS command enables such items as company bulletins, departmental announcements and operating information to reach key people by simulating an internal news service. The software also reportedly allows incoming messages to be scanned quickly by sender or subject category, read, and then answered, forwarded, deleted or filed for future reference.

The Messenger package licenses for $2,250, including two years of paid-up maintenance, Nestar said from 2585 E. Bayshore Road, Palo Alto, Calif. 94303.

Interface Speeds Text, Data Entry

TETERBORO, N.J. — Compuscan, Inc. has unveiled an interface that connects the vendor's Alphaword III optical character recognition page reader to the Comptek Research, Inc. Barrister/300 for high-speed text and data entry.

In operation, text typed on IBM Selectric or other single-element typewriters is input directly on the word processor without rekeying. Text appears on the Comptek Barrister/300 CRT terminal or high-speed typewriter in the same format as on the original typed page. There is no need to reformat text, according to the vendor.

Alphaword III intelligently reads text at a rate of up to 270 page/hour with an accuracy rate of less than one character substitution per 300,000 scanned characters, Compuscan said.

The interface costs $2,000 from Compuscan at 900 Huyler St., Teterboro, N.J.

WP, DP Aid Out On Unix, Idris

WAYLAND, Mass. — EEC Systems announced that its Lex-11 word and data processing package now is available under the Unix and Idris operating systems.

Lex-11 reportedly integrates word, list and DP functions and has features including single keystroke functions, "help" menus and English language commands.

Another feature of Lex-11 is that it can be interfaced to almost any existing video terminal or printer, according to the vendor. It also functions the same way, as far as the user is concerned, on every operating system.

The Unix version of LSX-11 is priced at $5,000 for a single end-user license. Prices for other operating systems vary from $2,500 to $7,500, according to the vendor at 286 Boston Post Road, Wayland, Mass. 01778.

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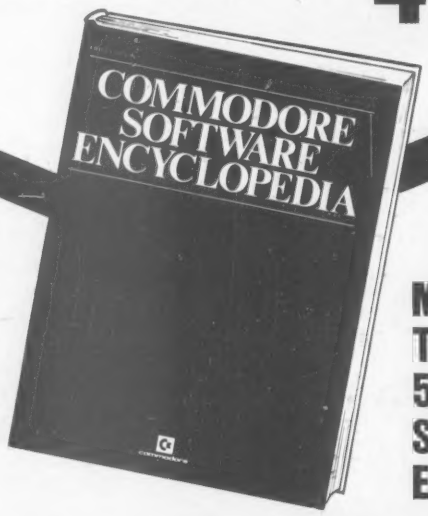

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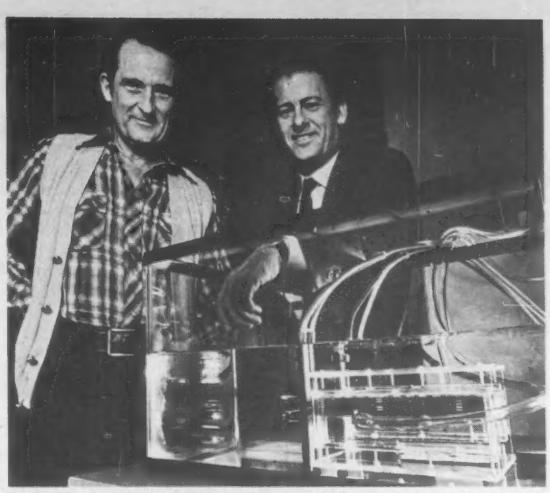
Honeywell Establishes New Groups

MINNEAPOLIS — Continuing the fine tuning of its information systems business, Honeywell, Inc. recently established two new groups and divisions.

Located here, the new Systems Group will manage the integration of the firm's product planning for both large and small systems, a spokeswoman said. Included within this group is a new division, the Network Management Systems Division, which is responsible for the development and manufacturing, when necessary, of the company's line of communications

(Continued on Page 86)



Seymour Cray (left) and John A. Rollwagen stand behind a three-dimensional module for the Cray-2 prototype immersed in a tank of inert liquid to demonstrate liquid immersion technology.

Cray Founder Steps Down As Chairman

MINNEAPOLIS — Seymour Cray, the founder of Cray Research, Inc., has stepped down as chairman of the firm to devote his time to designing the firm's new supercomputer.

At the same time, the firm announced a technological breakthrough that will permit the Cray-2 to have a 32M-word memory and a CPU cycle time of 4 nsec. The Cray-1 currently has a 4M-word memory and a cycle time of 12 nsec, the firm said.

Cray said the advance was made possible by applying liquid immersion technology to

(Continued on Page 86)

Pacific Northwest Drawing High Tech

By Robert Batt
CW West Coast Bureau

SEATTLE — As computer vendors in California's overcrowded Silicon Valley seek to expand their operations, more and more of them are looking to the Pacific Northwest.

The states of Washington and Oregon have acquired the reputation over the past few years of being fertile hunting grounds for high-technology companies on the lookout for a stable labor force and an emphasis on the quality of life. Oregon alone has more than 600 computer and electronics companies, while Bellevue, Wash., east of Seattle in King County, has developed into a beehive of high-technology activity with more than 160 electronics companies along the shores of lakes Washington and Sammamish.

In a recent survey of booming small towns in the West published by *Money Magazine*, Beaverton, Ore. (pop. 32,000) and Vancouver, Wash. (pop. 1,260) were cited among the top 10 small cities in the West. This is in large part a result of the electronics influx into these areas.

The emphasis on outdoor life, a determination to protect the environment and close proximity to Silicon Valley has enabled the Pacific Northwest to pose as a natural alternative to Northern California when it comes to setting up high-technology enterprises.

With the escalating price of housing, a shortage of suitable land space on which to build and a fierce recruitment environment, companies in the Santa Clara Valley, Calif., are finding it increasingly difficult to obtain and keep skilled personnel. In addition, bright computer scientists just out of college usually cannot afford to live in the San Francisco area, now identified as the costliest region in the nation.

Intel Corp., for example, located its first plant outside of Silicon Valley in Hillsboro, Ore., near Portland. The site was chosen, the company said, because of the availability of a stable la-

(Continued on Page 92)

Regional Report

As the computer industry has matured over the last 10 years, so has its geographical presence. Silicon Valley, Calif., and the Rt. 128 loop around Boston still represent the primary concentrations of manufacturing power, but other regions now lay claim to special recognition.

Amid vast stretches of desert, mountains and farmland, areas of computer expertise are growing up, spreading the benefits of information technology across the nation. Regions such as the Pacific Northwest, Arizona, Colorado, Texas, Tennessee and the Carolinas are vying to lure the computer giants, which bring to a region not only a considerable sum of wealth, but also employment opportunities, an influx of highly talented and educated personnel and the possibility of spinning off other companies.

With many regions needing to diversify their economies to reflect changing growth opportunities, those areas that can acquire a critical mass of computing and economic expertise can look forward to a sustained period of economic prosperity as the evolution of the information society unfolds. Over the coming months Computerworld *will, in an occasional series, take a look at those regions of the country that are attracting high technology.*

The series kicks off this week here and on Pages 92 through 95 with a look at some of the developments taking place in Washington and Oregon — the Pacific Northwest.

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Satisfactory Increases In '81 Profits, Says HP

PALO ALTO, Calif. — Hewlett-Packard Co. reported a 15% increase in revenues and a 16% increase in earnings for its fiscal year ended in October.

For fiscal 1981, the firm reported revenues of $3.58 billion compared with revenues of $3.10 billion a year ago. Earnings reached $312 million or $2.55 per share, up from 1980 earnings of $269 million or $2.23 per share.

Preliminary figures showed that the computer portion of the firm's business accounted for about 49% of total revenues.

During the fourth quarter, HP's revenues totaled $1 billion, up from $871 million in the final quarter of fiscal 1980. Earnings for the quarter were $94 million or 77 cents per share, up 19% from $80 million or 65 cents per share in the final quarter a year ago.

In commenting on the financial results, John A. Young, HP president and chief executive officer, called 1981 results "satisfactory," but said fourth-quarter performance was "below our expectations. Despite recording our first billion dollar sales quarter in the final three months of the fiscal year, we fell short of our objectives in both sales and incoming orders for the quarter."

Incoming orders for the year totaled $3.71 billion, an 18% increase from orders of $3.14 billion a year ago. International orders, when converted to dollars, continued to show a low rate of growth, particularly in Europe, Young said. These orders totaled $1.79 billion for the year compared with $1.62 billion in orders reported a year ago.

"We are monitoring order levels carefully as we enter fiscal 1982 and we are coupling this with increased emphasis on cost and hiring controls," Young said.

Directory Lists Venture Money For DP Firms

WASHINGTON, D.C. — Would-be entrepreneurs can locate sources of funding with a new directory called "The Databook of Venture Capital Sources for High Technology Companies." The directory contains listings of nearly 300 venture capital organizations with funds available for high-technology operations.

Of the organizations listed, 92% will invest in computer hardware, 88% in software and 92% in computer-related services. The average preferred investment ranges from $200,000 to $750,000 per deal. The directory describes the investment preferences of each venture capital firm along with the amount of capital.

The directory costs $115 from Financial Data Corp., Drawer 100, P.O. Box 57275, Washington, D.C. 20037.

Sperry Beefing Up DDP Presence

BLUE BELL, Pa. — In an effort to beef up its presence in the distributed data processing market, Sperry Univac has transferred its DDP minicomputer specialists to the firm's Americas Division mainframe marketing branches.

The V77 minicomputer sales force will work directly with mainframe sales personnel, according to Neil Gorchow, vice-president and general manager of the firm's Irvine, Calif.-based minicomputer operation (MCO). The firm said this type of team approach has worked very well in the firm's European operation.

At the same time, Gorchow said MCO will concentrate on its OEM and third-party marketing program and be responsible for manufacturing and product development for minicomputer products.

MCO will place more emphasis on marketing and support of applications software packages developed by Univac, other vendors and current V77 users.

Gorchow also said a main thrust of MCO continues to be the development of a new family of minicomputers that will feature 32-bit addressing and very large-scale integration.

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Seymour Cray Steps Down From Cray's Chairmanship

(Continued from Page 83)

removing heat from the system. The Cray-2 will be cooled by immersion in a bath of clear, inert liquid. This permits circuits to be packaged close to one another in three-dimensional modules, dramatically reducing the length of connecting wires.

The shorter the wires, the greater the potential speed, Cray noted, adding that the longest wire in the Cray-2 will be 16 inches, compared with four feet in the Cray-1.

Building Prototype

The prototype for the new system will be built at a new site under construction in Chippewa Falls, Wis. Cray said he expects the system will be phased into production during the next three to four years.

Portions of the company's Boulder, Colo., laboratories that have been pursuing research for the Cray-2 will be redirected to other activities.

When ready, the system will be marketed to an initial group of scientific users currently using the Cray-1.

Cray will function as an independent contractor for Cray Research on a royalty-free basis at least through 1985, devoting his entire time to system design and development. Although Cray is stepping down from the top slot at the firm, he will remain a director of the company and a member of the executive committee.

John A. Rollwagon, president, will assume the chairman's title.

Both parties have the rights to the results of the development work. Cray Research will also have the first opportunity to fund additional projects and production of future advanced systems that Cray may wish to pursue.

Wrap-Up 1981 and Look Into the DP/MIS Future in Computerworld's "Review And Projections," Our December 28/ January 4 Special, Combined Issue.

Computerworld's reporters are hard at work bringing together the major events of 1981 and giving you a look into the future of the computer industry. In "Review and Projections," you'll read about information systems technology and the people who make that technology work. Here are some of the important topics we're presenting:

- Personal computing within the large business environment
- Superminis vs. mainframes — what's best for you
- Software strategies of mainframes in the 80's
- Hot products in data communications
- Theory Z for MIS managers — how to improve productivity

And that's not all. You'll also be getting in-depth coverage on:

- Computer operators — a career outlook for 1982
- Budget survey — what's happened in DP departments over the years and what's the economic outlook for DP in '82
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- Future trends in the quest for information system reliability
- Implications of IBM's new 31 bit architecture
- Office automation — a general overview, how it's working in the real world and a product roundup
- Information centers — the wave of the future
- AT&T antitrust trial — what are the consequences in 1982
- Job enrichment for the DP professional

You'll read all this and much more in this combination year-end wrap-up issue. If you're a user who watches the trends, you'll want this guide to the future. And if you market products or services in the computer field, you'll want your ad here. Ad close is December 11. Your *Computerworld* salesperson can give you complete assistance in ad planning. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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Honeywell Reorganizes

(Continued from Page 83)

products.

The Network Management Systems Division, located in the Boston area, will be headed by J.J. Meyer.

Named vice-president and general manager of the new Systems Group was James R. Berrett, formerly a corporate vice-president for development.

In addition, Honeywell gave its U.S. Marketing and Services division group status. Michael G. Kelleher became the vice-president and general manager for the group. Prior to the restructuring, he held the same title on the divisional level.

Moreover, another division within this group, the Information Systems Division, was established. This division brings together four formerly separate marketing organizations — the national industry operations, the field marketing operation, the distribution and sales operation and the page printing systems operation.

This new division is headed by Frank D. Jakubnik.

Marketing Center To Open in Chicago

CHICAGO — The nation's first permanent marketing center for automated business and computer products will open in the Merchandise Mart here on Jan. 18.

Participating in Phase I of the new center are Texas Instruments, Inc., Digital Equipment Corp., Control Data Corp., Honeywell, Inc. and Apple Computer, Inc.

Phase II of the mart's new concept is gaining momentum, according to Brian Quirk, marketing manager for the Business Products Center.

A series of business seminars in support of the marketing of computers and automated business equipment will be started by the center in February.

Prime Names Former IBM Exec as President

NATICK, Mass. — Prime Computer, Inc. has named Joe M. Henson, a 27-year IBM executive, as its president, chief executive officer and a director.

Henson will replace John K. Buckner, interim president and Prime's vice-president of finance, who assumed the temporary job five months ago after the abrupt resignation of Kenneth G. Fisher.

Under Henson, Buckner will continue as chief financial officer and vice-president of finance, with the added responsibilities of administration and planning, according to the announcement by Prime Chairman of the Board David J. Dunn.

Henson, who has worked solely for IBM since earning an accounting degree from the University of Arkansas in 1954, held various executive positions there, primarily in the Data Processing Division.

He acted as vice-president and eastern regional manager, vice-president of industry marketing and vice-president of market planning. Most recently, Henson held the position of vice-president of management services for IBM's General Products Division in San Jose, Calif.

Henson's appointment came five days after two top-level Prime officials left the company. Both David F. Horton, who was vice-president of corporate development and responsible for long-term planning, and Donald P. Jacobs, vice-president of human resources, had been hired by Fisher.

Executive Corner

• John J. Dougherty has been appointed president and chief executive officer at Molecular Computer, a division of Molecular Logic Corp.

• Craig S. Hill has been named president of Cortex Corp.

• Michael J. Timbers has been appointed president of Information Handling Services at Indian Head.

• Deborah H. Gauer has been promoted to vice-president of consulting services for Communications Technology Management, Inc.

• James E. Pruitt has been elected vice-president, group executive, in charge of Harris Corp.'s printing equipment group.

• Tres Systems, Inc. has appointed Terence D. Jung vice-president of finance, secretary and treasurer.

• Stuart C. Johnson has been named vice-president of product marketing for the business machines group at Burroughs Corp.

• John H. Trollman has been named vice-president of finance for Dest Corp.

• John F. Bizjak has been appointed vice-president of systems at Locom Corp.

• Merritt M. Lutz has been named software products group vice-president at Informatics, Inc.

• George L. Bragg has been named president and chief executive officer of Telex Computer Products, Inc., a subsidiary of Telex Corp.

• Peter J. Shaw has been appointed president and chief executive officer of Megatek Corp.

• Melvin Posin has been appointed director of Printronix, Inc.

• Eugene B. Lotochinski has been named vice-president of advanced systems/business communications systems at Northern Telecom, Inc.

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The Comdex Show Floor

Software Vendors at Comdex Find Reality Living Up to Hopes

By Rory J. O'Connor
Special to CW

LAS VEGAS — The software market, which has spent its time at past shows crying "wait till next time," has finally found reality living up to expectations.

Indeed, this year's Comdex was the first major industry show where so many vendors indicated a positive attitude toward the market, declaring that the soft ware-driven computer marketplace is here.

The key issue yet to be settled, though, is which of several operating environments will emerge as standard in the ever-growing 16-bit microcomputer marketplace. With at least four or five major contenders in evidence at this show, the responses to this question were as varied as the ways to lose your money in this city.

While a major new Unix announcement had many people buzzing, Digital Research, Inc. announced further plans for its CP/M-86 and related operating systems, and advocates of rival Microsoft Inc.'s MS-DOS were predicting success for their operating system.

Softech Microsystems, Inc. pushed the UCSD P-System as the best solution, while Phase-One Systems, Inc. touted its Oasis as the real portable operating system for businesses.

'Maturity' Said Key

But the one word stressed by almost all the software vendors on the immense show floor was "maturity," a term echoed in sessions where standards and future trends were discussed.

In the near future, software of all varieties will be available for the major 16-bit microcomputers, predicted Paul O' Grady, president of Micro Focus, Inc. of Santa Clara, Calif. With similar operating systems, compilers and applications available, hardware manufacturers will "lose the competitive edge" of having software unavailable from other firms. That, he said, will force the manufacturers to "get back to what they're good at: selling hardware."

A crucial area for makers and vendors of software products in the next year, though, will not be so much the actual code, but the service and support to back it up. The difference between success and failure in the software market lies in the quality of support the firm offers its customers — and its customer's customers.

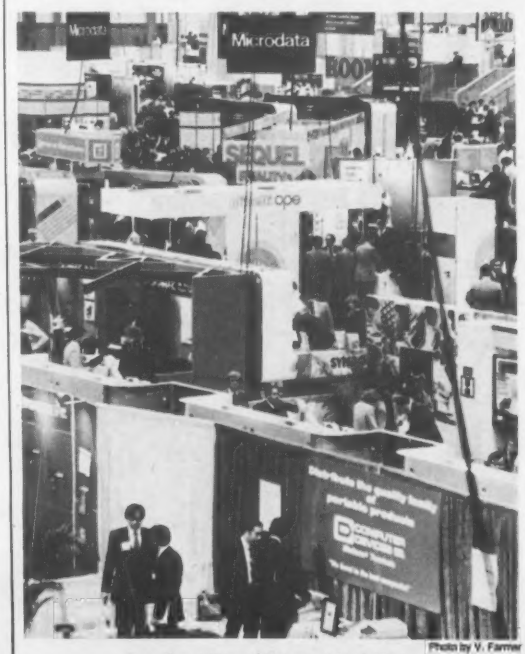
"A lot of what is required to make a success is support," declared Keith Parsons, president of Phoenix Systems, Inc. of Pittsburgh, Pa. "One of the big problems in the industry is figuring out how to make the end user successful. The companies that contribute to that solution will be successful in the future. We attempt to offer a support package through many levels — the manufacturers, the dealers and even the new customer. And in every case there is a charge for that."

It is conceivable the cost of support, which seems to be increasing daily, will at some point even outstrip the expense of the software itself, he noted. For that reason, software companies will have to protect themselves by breaking out the cost of support from the price of a package and recovering the cost of support directly from the customer. Especially in the microcomputer industry, "everything has to be unbundled," Parsons said.

More Support

Ben Dyer, president of Peachtree Software, Inc. of Atlanta, also stressed the need for support and the need to extend it beyond traditional areas.

"We've always had good dealer support, but not really end-user support. Now we've gotten big enough to give that kind of support, and we're not going to leave it undone," he said. "It's entirely possible [support] will cost more than software. Even an hour of high-tech labor is very, very expensive. It doesn't take much service to run into dollars."



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'82 Show Sold Out

'Hard-Core Trade Show,' Comdex Pulls 23,500

By Deborah de Peyster
Special to CW

LAS VEGAS — Comdex '81 has gone, leaving the 23,500 participants and attendees with the impression they have just been a part of the only "hard-core trade show" in the small computer systems industry.

The statistics seem to bear out that impression. In the three years since the show, largely for OEMs, began, Comdex officials said, attendance figures have continued to grow (from last year's 9,500 to 23,500), the number of exhibitors (648) has grown to exceed those at the National Computer Conference and the products unveiled and demonstrated at the show have come to embody the height of computer technology and its applications.

Sold Out for '82

Officials of the show, sponsored by the Interface Group, say they have sold out the 1982 Las Vegas show with 2,300 booth spaces (compared to this year's 1,650) and are looking to expand the space to 3,000 booths. They are seeking a location for a European show in the fall, and they anticipate that the 1,000 booths in Atlantic City, N.J., June 28-30 will draw attendance in excess of 10,000, a spokesman said.

The show has dramatically spruced up its appearance since it first began in the MGM Grand Hotel, Las Vegas, in 1979 with only 157 exhibiting companies in unmemorable booths. Now it rivals the NCC for professional pizzazz.

Dancers, singers and entertainers have replaced the musical computer and color video games formerly used to lure interest.

The hardware and software products contained within the booths have matured to focus on the needs of serious businessmen. The hobby image has faded and computer companies with reputations for games are quickly adding the "professional upgrade" — a machine with greater storage capacity and better software designed to focus on business solutions.

Integrated small systems with big business power are now the focus, with the 32-bit microprocessors running Unix or Unix-like operating systems at the peak of this trend.

And finally, software companies such as Lifeboat Associates, Digital Research, Inc., Peachtree Software, Inc. and Minicomputer Business Applications, Inc. have found their way into the mainstream of the show floor, moving from the positions they have held in the past along the periphery or next to fire exits.

Money With Software

Hardware vendors, too, have learned that they can and must make money with software. That new realization was evidenced in the signs on hardware booths that proclaimed various software capabilities. Comeons such as "Supercalc Shown Here" or "We Offer CP/M Compatibility" or just the posted software product name "Visicalc" were an effective draw.

While the numbers of software applications needed may still be lacking, software has come a long way to being accepted in the industry as the main ingredient for providing a solution to a customer.

As one industry observer said: "The hottest things on the floor are the software companies. Things have fallen into place now, where software companies are no longer worrying about how they will develop and sell a product. They're worrying now about what products to sell."

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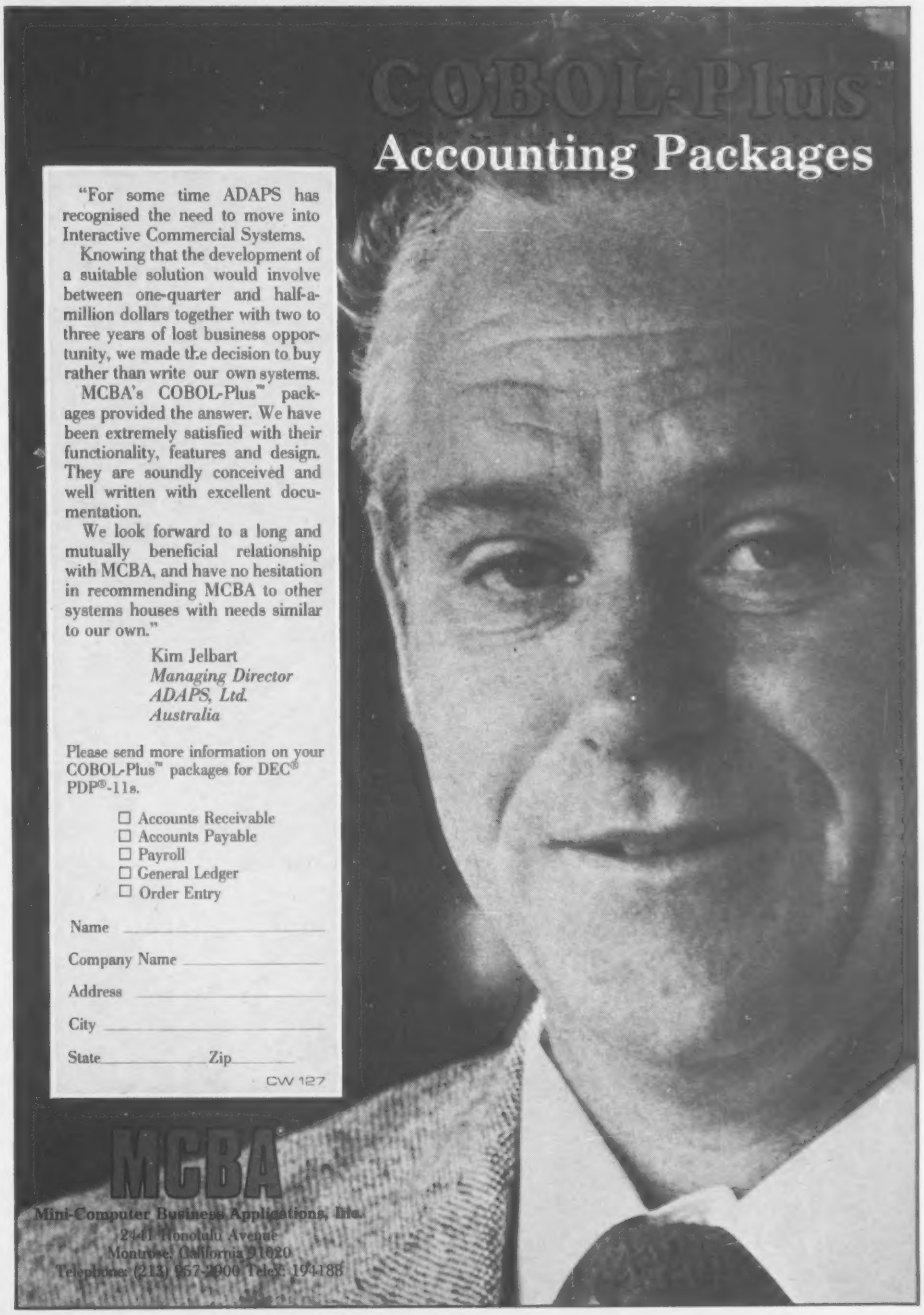

Nickels & Dimes

Icot Corp. has completed a private placement to two institutional investors and Wells Fargo Bank of $4,040,000 of preferred stock series C, convertible into common stock at $3.25/share.

$$$

Greyhound Computer Corp. of Canada Ltd. declared a dividend on its common stock of 12 cent/ share. The dividend is payable Jan. 2, 1982 to shareholders of record Dec. 9, 1981.

$$$

Ross Systems, Inc. has obtained one million dollars in financing for general working capital.

$$$

Dataflex Corp. has registered with the Securities and Exchange Commission for 600,000 shares of common stock with an offering price of $3.50/share. Proceeds will be used for equipment purchases, maintenance, capital expenditures and to retire short-term bank debt.

$$$

NCR Corp. declared a regular quarterly dividend of 55 cent/share on outstanding common stock payable Jan. 29, 1982 to shareholders of record Dec. 11, 1981.

$$$

Sentinel Computer Corp. recently completed its third private stock placement. The company plans to expand its marketing with the added resources.

$$$

Reynolds & Reynolds Co. declared a regular quarterly dividend of 27 cent/share on its class A common stock payable Jan. 11, 1982 to shareholders of record as of Dec. 18, 1981.

$$$

CXC Corp. completed initial financing with the venture capital firms of Kleiner, Perkins, Caulfield & Byers; Robertson, Colman, Stephens & Woodman; and Crosspoint Investment Corp. CXC President Joe Leonardi stated: "The initial equity financing has been completed in conjunction with a research and development limited partnership for the development of a distributed office information exchange system."

$$$

Computer Memories, Inc. has filed a registration statement with the Securities and Exchange Commission for the public offering of 600,000 shares of common stock.

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Expansions

STSC, Inc. has relocated its corporate headquarters to 2115 E. Jefferson St., Rockville, Md. 20852.

Sperry Univac and **Ryan Construction Co.** have signed a $4 million, design/build, turnkey lease agreement for Univac's new computer reconditioning center in Mendota Heights, Minn.

The completion of its move to new quarters was announced by the **Kinex Corp.**, which is now based at 6950 Bryan Dairy Road, Largo, Fla. 33543.

Computervision Corp. will open a new 44,000 sq-ft production facility in Dreieich-Sprendlingen, near Frankfurt, in the Federal Republic of Germany.

DBMS, Inc. has relocated to new corporate headquarters at 1801 A Mill St., Naperville, Ill. 60540.

New Companies

Brown Disc Manufacturing, Inc. has been formed to manufacture and market ultra-high-recording density flexible disk media for the computer industry. The company was started by a group of former executives from Digital Equipment Corp. and Control Data Corp. It is located at 1015 Garden of the Gods Road, Colorado Springs, Colo. 80907.

O'Reilly & Associates, a consulting group specializing in technical communications, has been formed to provide technical writing and applications programming consulting. The company is located at 171 Jackson St., Newton Centre, Mass. 02159.

Circle Software Corp. has been formed to provide systems consulting services and software for large IBM computers. The firm specializes in computer security software and is based at 1100 W. 31st St., Downers Grove, Ill. 60515.

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TO: Data Communications Users

DATE: Now

SUBJECT: AT&T/Bell High Monthly Modem and Private Line Rates

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MISC.	
T801C	Auto Call Unit
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LDM 710	Limited Distance Modem
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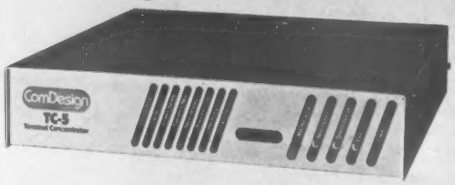

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Northwest Drawing High Tech

(Continued from Page 83)

bor force and a desirable lifestyle capable of attracting key skilled workers from outside the state.

Robert Phillips, personnel manager at the Intel plant said, "Most of the people we recruit from outside come from the Sunbelt states. But although the climate is very different, once we get people here it is very hard to get them out again."

A gentler pace of life, the relative absence of a rat race and an outdoor, family-oriented community with mountains and ocean nearby combine to attract the computer bod striving to get the best of all possible worlds.

In some areas of the Northwest, the arrival of large computer firms is considered so vital that regional authorities are beginning to plan their local development around such companies.

In Vancouver, Wash., for example, an industrial development site is actively being planned around two companies — Hewlett-Packard Co. and Tektronix, Inc., which have committed themselves to setting up plants in the area.

"The Vancouver site will not be the haphazard patchwork job that has been the case in some areas of Silicon Valley over the years," said James Law, HP's corporate manager for land and facilities development. Plans for the site include bike trails, jogging paths and community parks.

Limit on Growth

At the same time that they are on the lookout for new technology enterprises to set up in the region, local authority officials and many high-technology firms themselves are keen to place a limit on growth.

"High-technology companies come here because they don't want to go right back into the conditions from which they have escaped," explained Allan Mann, manager of business development at the Washington Department of Economic Development.

"So we have mixed emotions. We don't want to see industry lined up one road after another; we don't want to develop another Silicon Valley. At the same time, we have to do some work to provide those large companies with the land they desire — hence the emergence of industrial parks."

The companies themselves, especially the small independent houses, are also conscious of the need to keep the lid on development. A typical comment came from James Nick vice-president of Industrial Systems, Inc., a Kirkland, Wash.-based manufacturer of real-time computer-based controls.

"For us to go to, say, $5 million in sales doesn't fit with the kind of products we want to produce. We are a high-quality, highly conservative, high-technology firm and want to keep it that way," he said.

While many firms share that philosophy, it is in part dictated by external circumstances. For example, according to Sharon Kafoury, industrial manager at the Portland Chamber of Commerce, the educational infrastructure is incapable of supporting a technology explosion such as occurred in the Bay area.

"We do not at present have a school system that will turn out all the computer scientists and engineers we need and so we are looking at more vocational training in the electronics field," she said. Also, the region has yet to attract the venture capital community so instrumental in the growth of Silicon Valley.

But whatever the interim difficulties, the Pacific Northwest, suffering from a decline in traditional industries such as timber, has undoubtedly opened its doors to the type of clean environment that high technology represents and which is compatible with all the best that the region has to offer.

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Ramtek Plans to Establish A Distributor Network

SANTA CLARA, Calif. — Ramtek Corp. has announced plans to establish a distributor network that will complement its direct sales force in the U.S. and Canada. Until now, Ramtek has sold only through an end-user sales force.

Initially, Ramtek will offer its 6211 Colorgraphic terminal and the 4100 Colorgraphic printer through the distribution network.

The decision to sell through distributors was made because the firm's product line has evolved to include more general-purpose, lower cost devices, according to Tony Glinskas, vice-president of sales.

Heading up the distributor program is Brian Holgate, national OEM/distributor sales manager. The program will offer distributors product training and technical and field service support from the firm's service centers and regional depots.

Ramtek is now evaluating other products for subsequent inclusion in the new marketing program.

'Next Time Try Lettin' Go of the Cards.'

Despite Remote Location

Oregon an Option for Multinational Vendors

By Robert Batt
CW West Coast Bureau

BELLEVUE, Wash. — One of the striking things about the computer industry is its flexibility in terms of geographical location.

Unlike the Industrial Revolution, the Age of Information Technology is not dependent on immediate access to waterways, forests or coal reserves. Indeed, when it comes to choosing a region for setting up computer manufacturing facilities, the requirements are pretty simple.

"All you really need," pointed out James Law, corporate manager for land and facilities development at Hewlett-Packard Co., "is good airport access, a livable environment with good schools and housing and a site that is available on relatively flat land. Providing you have these basic facilities you can put a plant virtually anywhere, and so we put great emphasis on where our people like to go."

Number of Options

Large multinationals such as HP, Intel Corp., IBM and Digital Equipment Corp., therefore, have a large number of options when choosing a site for further expansion. Conversely, the nature of the industry is such that companies wishing to grow do not necessarily have to be constrained by their location and can acquire a sizable base without recourse to the fashionable areas of California and New England.

Oregon, in particular, contains two examples of companies that have become leaders in their respective fields while continuing to base their headquarters in a relatively remote part of the nation: Floating Point Systems, Inc. (FPS) and Tektronix, Inc.

FPS, based in Beaverton, Ore., and generally regarded as the leading manufacturer of array processors, recorded revenues of $42 million in the first nine months of 1981, equalling its year-end total for 1980. Security analysts anticipate this year's total to reach $50 million.

Sophisticated Product

Founded by a former Tektronix executive, Norman Winningstad, who is now chairman of the board, FPS employs 1,100 people. Its biggest customer is General Electric Co., which last year placed a $60 million contract for array processors to be used in its line of X-ray tomography scanners.

"We are a small company with a sophisticated device in an out-of-the-way part of the country so we have to do a very good marketing job to get business," Jack Carveth, FPS manager for financial development, explained.

The FPS array processor is often the alternative to bringing in another Digital Equipment Corp. VAX-11 processor or Control Data Corp. machine. As such, it is competing against more traditional computing systems, but often at a cheaper cost.

FPS' Oregon location has not prevented it from doing 26% of its business overseas and this proportion of total revenues is expected to increase. The company is now starting up a manufacturing plant in the Irish Republic.

$100 Million Market

With the use of array processors in scientific and engineering applications continuing to grow, this year's market could top $100 million. According to analysts, the introduction of its latest FPS 164 model, priced at between $120,000 and $600,000, means the 10-year-old Beaverton company is poised to reap some substantial rewards in the next few years.

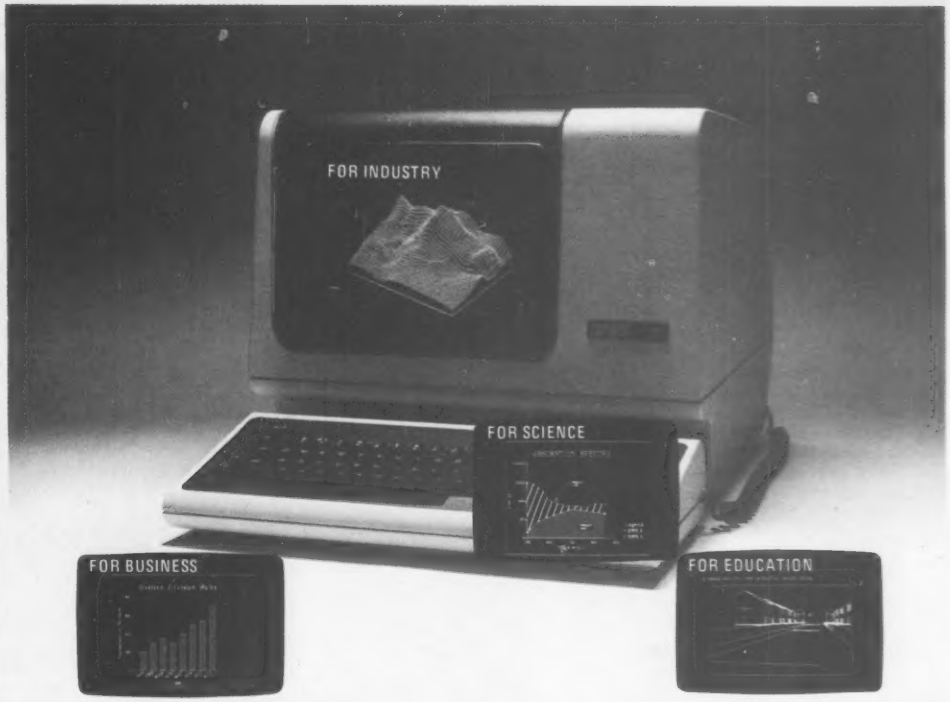
The success of FPS and other smaller local companies is due, in no small measure, to the durability of Tektronix, long considered to be a major force in the world of computer graphics. Although the company, established in 1946, had a disappointing last financial year with profits down 6%, it still remains the major force in the economics of the Portland region.

Regional Report

Just as one manufacturer — Boeing Co. — dominates the economic landscape of Seattle, so Tektronix acts as the pulse for the local economy.

With 18,000 employees in the Portland area, it remains by far the biggest private employer in the state.

During the past two years, the company has undergone some major organizational changes with the formation of product-oriented divisions. With an increasing emphasis on applications areas such as the recently announced two-dimensional drafting software package for the 4050 series [CW, Nov. 16] and more cost-effective hardware, the company expects to rejuvenate its performance, which until this year saw earnings rise nine years in a row.



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In Northwest, Not Only Big Cities Attractive

By Robert Batt
CW West Coast Bureau

BEND, Ore. — It is not only in the major cities like Seattle and Portland that high-technology companies are beginning to set up shop. Here, deep in the heart of central Oregon, one company is demonstrating the versatility of high-technology manufacturers.

Manufacturing and selling microcomputer products for monitoring the efficiency of business equipment, Xytech Corp. is Bend's first high-technology firm. "It could be a milestone," Jon D. Tompkins, company president, said. "I think we have the ability to stand as a reference point for others who are thinking about moving."

Regional Report

With costs for such necessities as housing rapidly escalating in the larger cities, high-technology firms have begun to move into remote locations where employees can enjoy higher standards of living and quality of lifestyles. Tektronix, Inc., for example, plans to build a plant in Redmond, Ore., — a little town on the eastern side of the Cascade Mountains — while other smaller electronics companies have already set up shops in such out-of-the-way places as Medford, Roseburg and White City, Ore., where International Memories, Inc. is manufacturing disk drives.

Tompkins asserts that high-technology firms, in Northern California in particular, are bursting at the seams, with competition intense and housing costs sky-high. This spells high employee turnover, he said, and so companies will be forced to look for ways out.

In an attempt to cash in on the potential demand, community leaders in central Oregon have formed the Economic Development Council to woo new industries into the area. Already the council has contacted more than 500 firms in California's Santa Clara County and a further 500 in Orange County.

How well these overtures are received will probably depend on the economic climate.

Contracts & Pacts

Computer Sciences Corp. has been awarded a contract by the U.S. government for a computer-based interactive management information system. The contract is valued at approximately $13 million over the next four years.

Varicomp International, an OEM manufacturer based in Fairfield, N.J., has signed an agreement valued at $24 million for the purchase and resale of more than 1,000 Honeywell, Inc. DPS 6 minicomputers over the next three years.

Evolution Computer Systems Corp. of Orange, Calif., and Computalpha, an Evolution vertical market dealer based in Merrick, N.Y., have signed a two-year contract for $5.8 million of Evolution relational data base computer systems and spares.

Computalpha has a contract to supply systems to the diversified French conglomerate, BIS, S.A. The systems range from a small eight-user 64K-byte system up to a 512K-byte system. Initial deliveries are scheduled to begin in December 1981.

Planning Research Corp. of McLean, Va., has been awarded two contracts valued at a total of $4.4 million by the U.S. Air Force's Rome Air Development Center to provide intelligence data handling systems.

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Specializing in Micro Languages

Small Software House Finds Room to Grow

By Robert Batt
CW West Coast Bureau

KIRKLAND, Wash. — A small software systems house here exemplifies the rapid pace at which the Pacific Northwest is coming to be recognized as a center for data processing expertise.

Microsoft, Inc., specializing in software for small business systems and microcomputers, has sales in excess of $15 million. Its customers include IBM (it produced the Basic interpreter for the IBM Personal Computer), Xerox Corp., Texas Instruments, Inc. and Digital Equipment Corp.

What is unusual about this five-year-old company is that it was founded by two men in their early 20s and almost all of its 80 employees are under 40.

Bill Gates, 25, and Paul Allen, 28, — founders of Microsoft — began their business careers 10 years ago when, as precocious students in Seattle, they had access to the University of Washington time-sharing service. Soon the two were in business on their own, reading punched paper tapes from traffic intersection recorders for a South Seattle company. Gates and Allen came up with the idea of computerizing the process and Traf-O-Data was born, delivering reports to customers including the state of Maryland.

While still at school, Gates and Allen landed jobs with TRW, Inc. in Vancouver, Wash., and shortly after-

Regional Report

wards they both moved to Boston, Allen to work for Honeywell, Inc. and Gates to attend Harvard University. It was at this time that the two young men began to work on the problem of providing software for microcomputers. In 1975, Microsoft was born.

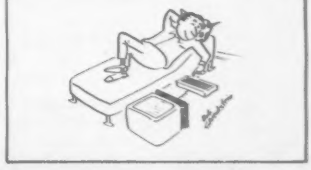
"They saw from a very early stage that micros would be used everywhere to support general-purpose computing and would, therefore, require some languages," Marc Jasino, a colleague at Microsoft, said.

The company is currently concentrating on the 16-bit micro market which, Jasino said, "gives us the power and the memory addressing that will allow us to do some significant user-addressed software." With Gates and Allen always on the lookout for how new technology will affect their business, the company is now studying the office-of-the-future market, new networking and hardisk technology and the latest display technology.

Right from the start, the two founders were very aware of the vital role that people play in an organization. They considered setting up their company in the San Francisco Bay Area, but decided instead on Seattle.

"Silicon Valley was one of the two places we decided we could go, but there is a very high turnover in employees there; everybody's raiding everybody else. The other choice was Seattle, which has a relatively good base of programmers, and it's not difficult to get people to move here," Allen said.

So, in the end, the two students returned to their home patch. The company has just moved into spacious new offices and with the company doubling in size every year, prospects seem good.



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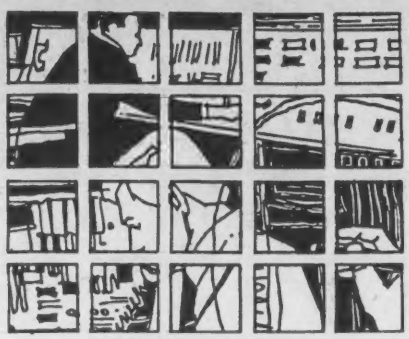

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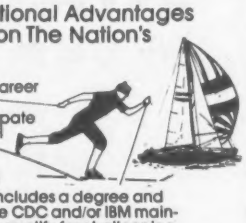

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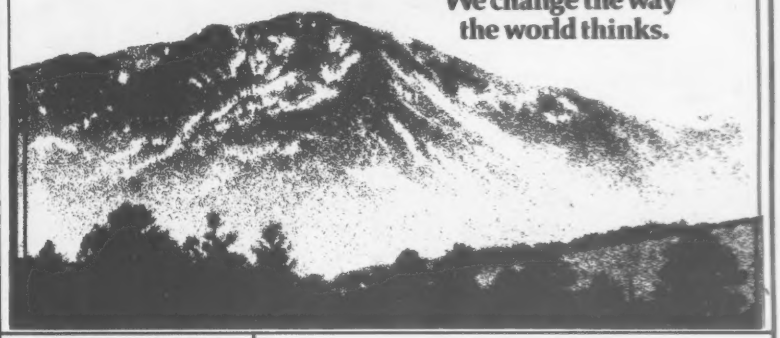

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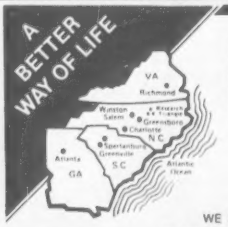

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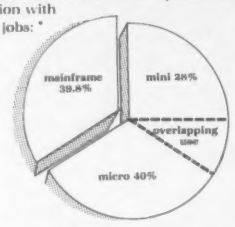

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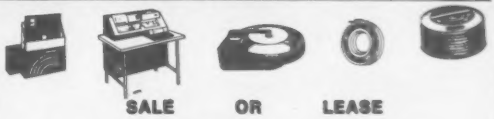

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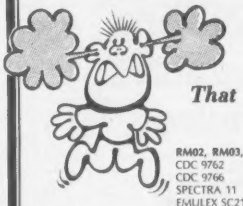

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168 - KJ (1435, 3855, 3066-2, 3067-2, 2-2870's, 3-2880's w/1862)	lease only	12/31/81
370/158		
158 - U35 (1433, 1434, 1435, 7840, 3213-1 w/4450)	lease only	1/01/82
158 - J (3213 -1)	lease only	now
370/148		
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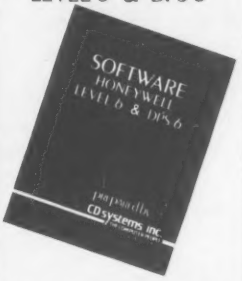

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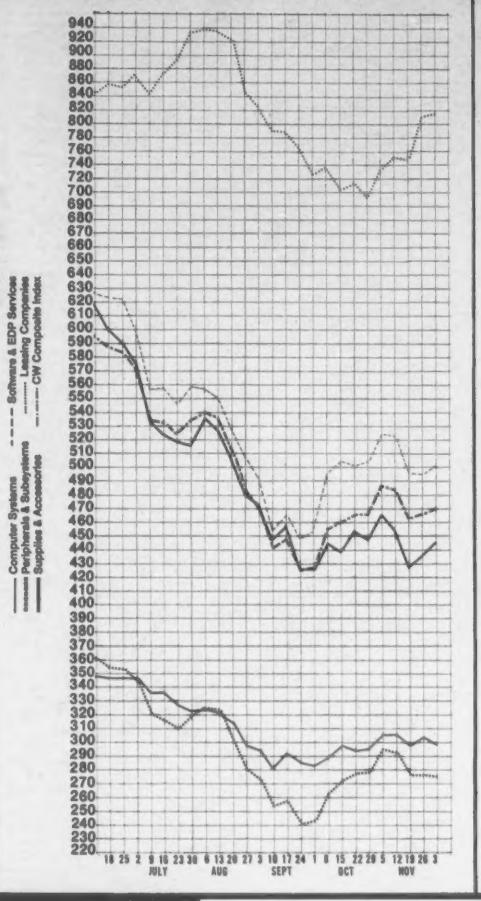

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 2, 1981

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1980-81 RANGE (1)	CLOSE DEC 2 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	23- 46	28 1/4	+ 7/8	+3.0
N	BURROUGHS CORP	28- 72	34 1/4	+ 1/4	+0.7
O	COMPUTER AUTOMATION	8- 28	11	-1 1/4	-10.2
N	CONTROL DATA CORP	19- 42	38 1/2	-1 7/8	-4.8
N	CRAY RESEARCH INC	28- 48	37	+1 3/8	+3.8
N	DATA GENERAL CORP	42- 87	55 5/8	+ 5/8	+1.1
N	DATAPOINT CORP	40- 68	48	+ 7/8	+1.8
N	DIGITAL EQUIPMENT	80-113	88 1/4	-4 1/8	-4.4
A	EECO INC	7- 18	7 7/8	+ 3/4	+10.5
N	ELECTRONIC ASSOC.	5- 13	5 3/4	+ 1/8	+2.2
N	FOUR-PHASE SYSTEMS	18- 46	34 1/2	+7 1/8	+26.0
N	FOXBORO	42- 82	54 3/4	+1	+1.8
O	FULCRUM COMP GRP	1- 3	3	3/8	0	0.0
O	GENERAL AUTOMATION	8- 16	5 7/8	- 1/8	-2.0
N	HARRIS CORP	38- 80	41	+1 1/4	+3.1
N	HEWLETT-PACKARD CO	33- 54	41	+1	+2.5
N	HONEYWELL INC	71-115	72	- 1/2	-0.6
N	IBM	48- 73	53	+ 3/4	+1.4
O	MAGNUSON COMP SYSTS	10- 32	8 3/4	0	0.0
N	MANAGEMENT ASSIST	11- 26	11 3/8	- 1/2	-4.2
O	MINI-COMPUTER SYST	1- 4	1 1/4	+ 1/8	+11.1
N	MODULAR COMPUTER SYS	7- 32	7 7/8	+ 7/8	+12.5
N	MOHAWK DATA SCI	11- 32	13 1/2	+ 3/8	+2.8
N	NCR	39- 76	41	+ 1/4	+0.6
N	PRIME COMPUTER INC	18- 49	23	- 7/8	-3.6
N	PERKIN-ELMER	21- 36	25 1/8	+ 3/8	+1.5
N	SPERRY CORP	30- 65	34 5/8	+2 3/4	+8.6
O	TANDEM COMPUTERS INC	13- 35	28 1/2	-1 1/2	-5.0
N	TEXAS INSTRUMENTS	75-151	75 3/8	+3 1/8	+4.0
A	WANG LABS.	23- 46	28 1/2	+1 3/4	+6.5

LEASING COMPANIES

EXCH		1980-81 RANGE (1)	CLOSE DEC 2 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	18- 28	22 3/4	+ 1/2	+2.2
N	COMDISCO INC	18- 29	24 3/8	+ 3/8	+1.5
O	COMMERCE GROUP CORP	1- 2	1 1/8	0	0.0
O	COMPUTER INVSTRS GRP	1- 4	1 1/4	0	0.0
O	CONTINENTAL INFO SYS	4- 9	5	0	0.0
A	DCL INC	3- 4	3 5/8	0	0.0
N	DPF INC	5- 13	11 5/8	0	0.0
O	ITEL	1- 15	7/8	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	RELIANCE GROUP INC	65-100	100	+1	+1.0
N	U.S. LEASING	18- 30	24 3/4	+ 3/4	+3.1

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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SOFTWARE & EDP SERVICES

EXCH		1980-81 RANGE (1)	CLOSE DEC 2 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	2- 8	2 1/4	- 3/4	-25.0
O	ADVANCED SYSTEMS INC	10- 15	13 1/2	0	0.0
O	ANACOMP INC	11- 19	13 1/2	+ 7/8	+6.9
O	ANALYSTS INTL CORP	3- 14	8 1/4	0	0.0
A	APPLIED DATA RES.	13- 25	22	+ 1/4	+1.1
N	AUTOMATIC DATA PROC	22- 32	27 3/4	0	0.0
O	CGA COMPUTER ASSOC	4- 25	8	+ 3/4	+14.2
O	COMPUTER HORIZONS	1- 5	3 1/4	+ 1/2	+18.1
O	COMPUTER NETWORK	4- 8	4 1/8	0	0.0
N	COMPUTER SCIENCES	12- 30	11 3/4	-1	-7.8
O	COMPUTER TASK GROUP	13- 23	14 1/2	0	0.0
O	COMPUTER USAGE	2- 10	2 3/4	0	0.0
O	COMSHARE	7- 21	8	+ 1/4	+3.2
O	CULLINANE DATABASE	15- 37	34 1/2	+1 1/2	+4.5
O	DATA DIMENSIONS INC	0- 4	1/8	0	0.0
O	DATATAB	1- 4	1 3/8	+ 1/8	+10.0
O	DSI CORP	4- 9	8 1/8	+ 5/8	+11.3
O	DYATRON CORP	3- 11	3	0	0.0
N	ELECTRONIC DATA SYST	15- 30	24 1/2	+ 3/8	+1.5
O	INFORMATICS INC	17- 34	26 3/4	- 1/4	-0.9
O	INSYTE CORP	1- 3	2	0	0.0
O	IPS COMPUTER MARKET.	1- 4	1 1/2	- 1/4	-14.2
O	KEANE ASSOCIATES	4- 8	4 3/4	0	0.0
A	LOGICON	23- 38	28 1/4	+ 1/8	+0.4
O	MNGT SCI AMER INC	17- 26	23 1/4	+1 1/4	+5.6
O	MATHEMATICA INC	12- 24	21	0	0.0
O	MATHEMATICAL APP GRP	15- 28	18	+2 1/2	+16.1
O	NATIONAL DATA CORP	14- 28	20 7/8	+ 1/4	+1.2
N	PLANNING RESEARCH	5- 13	8 1/8	- 1/8	-2.0
O	PROGRAMMING & SYS	1- 2	1	-	-5.5
O	RAPIDATA INC	5- 18	15 7/8	+ 1/2	+3.2
O	REYNOLDS & REYNOLD	18- 26	20 3/4	+1	+5.0
O	SEI CORP	17- 28	26	+ 1/2	+1.9
O	STSC INC	7- 28	8	0	0.0
O	SCIENTIFIC COMPUTERS	8- 16	7 5/8	- 1/4	-3.1
O	SOFTWARE AG	11- 23	16	+ 1/4	+1.5
N	TYMSHARE INC	23- 38	27 7/8	0	0.0
A	URS CORP	11- 18	14 1/8	+ 1/4	+1.8
N	WYLY CORP	7- 20	8 3/8	- 1/8	-1.4

PERIPHERALS & SUBSYSTEMS

EXCH		1980-81 RANGE (1)	CLOSE DEC 2 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	4- 25	4	- 3/8	-8.5
A	ANDERSON JACOBSON	10- 26	12 1/8	- 1/4	-2.0
O	AUTO-TROL TECHNOLOGY	10- 62	11 3/4	+ 1/4	+2.1
O	BANCTEC INC	20- 35	32 1/4	-1 1/4	-3.7
O	BEEHIVE INT'L	8- 18	7 5/8	0	0.0
A	BOLT,BERANEK & NEW	8- 25	10 3/4	- 1/4	-2.2
O	CAMBEX CORP	2- 8	3 1/8	+ 1/8	+4.1
N	CENTRONICS DATA COMP	7- 40	11 1/8	0	0.0
A	CETEC CORP	4- 9	4 3/8	- 1/8	-2.7
O	COMPUTER DEVICES INC	4- 10	7 5/8	+ 7/8	+12.9
O	COGNITRONICS	3- 11	3 3/8	0	0.0
O	COMPUTER COMMUN.	1- 8	1	- 1/8	-10.5
A	COMPUTER CONSOLES	19- 28	21 3/8	-1 1/4	-5.5
O	COMPUTER TRANSCEIVER	3- 9	6	- 1/4	-4.0
N	COMPUTERVISION CORP	20- 49	28 1/2	- 3/8	-1.2
N	CONRAC CORP	17- 28	22 5/8	- 3/8	-1.6
A	DATA ACCESS SYSTEMS	5- 23	5 3/4	- 3/4	-11.5
A	DATAPRODUCTS CORP	19- 44	22 1/2	+ 3/4	+3.4
O	DATUM INC	2- 5	1 3/4	0	0.0
O	DAVID JAMISON CARLYL	3- 5	4 1/2	0	0.0
O	DECISION DATA COMPUT	3- 6	2 3/4	0	0.0
O	DELTA DATA SYSTEMS	2- 4	2 5/8	- 1/8	-4.5
O	DATARAM CORP	4- 15	7 3/4	+1 5/8	+26.5
N	ELECTRONIC M & M	3- 9	3 1/2	0	0.0
O	EVANS & SUTHERLAND	18- 40	34 1/2	+1 1/2	+4.5
O	FABRI-TEK	2- 6	3 5/8	- 1/8	-3.3
O	GENERAL COMPUTER SYS	1- 12	6 3/4	0	0.0
N	GEN'L DATA COMM IND	8- 19	8 1/4	- 1/4	-2.9
O	GENERAL TERMINAL CP	1- 4	7/8	0	0.0
N	HAZELTINE CORP	19- 35	25 5/8	+1 1/8	+4.5
O	INFORMATION INTL INC	8- 17	12 1/2	- 1/2	-3.8
O	INTEL CORP	23- 51	25 1/4	+ 3/4	+3.0
O	IPL SYSTEMS INC	6- 15	7 3/4	0	0.0
A	LUNDY ELECTRONICS	7- 18	9	+1 1/4	+16.1
A	MSI DATA CORP	11- 27	16 1/2	-1 3/4	-9.5
N	MEMOREX	8- 18	13 7/8	+ 1/4	+1.8
O	NETWORK SYSTEMS CORP	14- 25	21 1/2	+ 3/8	+1.7
O	OMEX	2- 12	8	0	0.0
N	PARADYNE CORP	25- 52	43	- 7/8	-1.9
A	PENRIL CORP	9- 17	10 3/8	- 5/8	-5.6
O	RAMTEK CORP	9- 23	13	- 3/8	-2.8
N	RECOGNITION EQUIP	6- 21	6	0	0.0
O	SCAN DATA	1- 5	1	- 1/4	-20.0
N	STORAGE TECHNOLOGY	18- 40	36 7/8	+ 1/8	+0.3
O	SYKES DATATRONICS	8- 34	23	- 3/4	-2.5
A	T BAR INC	12- 19	13 1/2	- 3/8	-2.7
A	TEC INC	4- 7	5 3/4	+ 1/2	+9.5
N	TEKTRONIX INC	46- 70	54 1/2	+1 3/8	+2.5
N	TELEX	5- 9	5 1/2	- 1/4	-4.3
O	TESDATA SYSTEMS CP	6- 17	7 7/8	- 1/8	-1.5
A	TIMEPLEX INC	9- 19	9 1/4	0	0.0
O	WILTEK INC	1- 3	2 5/8	+ 1/8	+5.0

SUPPLIES & ACCESSORIES

EXCH		1980-81 RANGE (1)	CLOSE DEC 2 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	11- 17	12	+ 1/4	+2.1
O	BALTIMORE BUS FORMS	1- 2	3/4	- 1/4	-25.0
N	BARRY WRIGHT	15- 24	17 3/4	+ 3/8	+2.1
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 17	11 7/8	- 1/8	-1.0
N	ENNIS BUS. FORMS	15- 23	20 5/8	- 1/8	-0.6
N	3M COMPANY	48- 65	53 3/4	+ 3/4	+1.4
O	MOORE CORP LTD	27- 38	32 1/2	+2 1/2	+8.3
N	NASHUA CORP	17- 33	17 3/4	- 3/4	-4.0
O	STANDARD REGISTER	30- 41	34 1/4	+ 1/4	+0.7
A	TAB PRODUCTS CO	15- 30	15 1/8	- 5/8	-3.8
N	WALLACE BUS FORMS	22- 36	35	+1 1/2	+4.4

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My computer system is_____

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Telephone_____ CW